ECONOMIC TRENDS AND CYCLES IN
MICHIGAN FARM PRODUCTS

Thesis for the Degree of M. S.
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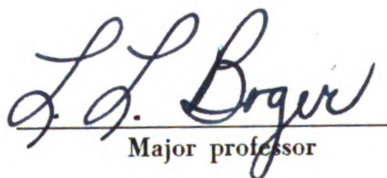1953

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ECONOMIC TRENDS AND CYCLES IN

MICHIGAN FARM PRODUCTS

By

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INTRODUCTION

The Problem. Significant trends and cycles in prices, production, and yield have occurred in Michigan Agriculture in the past four decades. At present there is no inclusive, up-to-date report of these movements for Michigan farm products; and, in view of the present concern of farmers, marketing personnel, extension personnel and other educators in prices, production, and yields of farm products, it is felt that there is a need for this type of information.

It is the purpose of this thesis to illustrate the significant trends and cycles of the major Michigan farm products and to analyze their causes and peculiarities. In conjunction with this, it is hoped that by combining certain selected products, adjustments in the production on Michigan farms can also be illustrated.

Uses of the Information. An analysis of this type may assist marketing personnel in forecasting future adjustments in agriculture. By referring to these movements through time it is hoped that they will gain some further perspective that will guide their projections of current and historical facts into the future.

A report of this nature may be of interest to farmers and extension personnel who are planning actual farm

operations. The analysis of cycles of farm products may
be helpful as a guide in selecting or adjusting enterprises
on a farm, or for measuring the statistical position of
price and production of already existing enterprises. As
an indicator of past marketing conditions, possible future
marketing conditions can be interpreted. Information of
this nature would be of assistance to farmers also in
determining when to sell their products so as to increase
profits.

It is hoped that marketing agencies, processors of
agricultural products, manufacturers, as well as anyone
who buys or sells Michigan farm products can make use of
this information.

Sources of Data. In this study, data were collected
for a period of forty-two years, from 1910 to 1952. The
annual figures for prices, production, yields, and number
of animals during this period were taken from the reports
of the State Agricultural Statistician, Lansing, Michigan.

In deriving purchasing power, the annual prices were
deflated by the Index of Prices Paid by Farmers. This
Index was prepared by the Bureau of Agricultural Economics
of the United States Department of Agriculture, and for
this study was obtained from the "Agricultural Outlook
Charts," 1951, published by the same bureau.

Methods of Procedure. In determining trend lines
for prices, production and yields of the major Michigan
farm products, two lines were fitted to the data in each
case. One of these trend lines was a straight line of
the form $y = a + bx$, which was fitted by the least-squares
method. The second trend line was a curved line, or
parabola, of the form $y = a + bx + cx^2$. These two lines
were then compared in each case by analysis of variance
to determine which was the more representative of the
data.[1]

Besides these two methods of representing trend in
a time series, there are others which may have proven
just as useful. One of these is the exponential trend
which is essentially a linear trend fitted to the
logarithms of the data. It may be dangerous to use,
however, if the trend is to be projected for long periods
in the future. Another type of trend line is the
logarithmic or growth curve, which is used mainly to
illustrate the transitional growth or increase in industry
between two periods of increasing production. Still
another type of trend is the moving average. Although
it possesses many advantages such as simplicity and

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[1]An example of the statistical technique is given in
  Appendix A.

ease of calculation, it is not used here because it does not adequately reflect the data at the extremes of the series. Because of the disadvantages of these various methods of representing trend it was decided that the straight line trend and the parabola, offered the greatest possibilities for accurately measuring these series of data.

Cycles in prices and production were not evident in the case of farm crops. But for livestock and livestock products where price cycles were apparent, the trend was first removed by deflating the price series using the Index of Prices Paid by Farmers in United States. This deflated price or purchasing power was then converted to an index of purchasing power using the years 1910-14 as a base period. In the case of production or numbers of animals, trend was removed by expressing the data as a percent of the selected trend. These percentages were then plotted to show the existence of cycles.

In time series there are two general types of cycles or oscillations. These are harmonic cycles and autoregressive cycles. Harmonic cycles are characterized by regularity in time, i.e. their peaks and troughs recur at regular intervals. This type of cycle is not as prevalent in

agricultural price, production, and yield data as the autoregressive cycle, which is characterized by frequent variations in both length and amplitude. The peaks and troughs of autoregressive cycles do not always occur at regular intervals, however the movements are self-energized and so, can be termed a true cycle.[1]

Definition of Terms

(1) Secular Trend: This is a characteristic of a series of data which extends consistently throughout a long time period. It represents a gradual long-time upward or downward movement in the data. This study was confined mainly to trends in prices, purchasing power, production, and yield of the major Michigan farm products.

(2) Cycles: Cycles are changes which occur over a number of years with more or less regular periodicity and which are self energized where one part of the movement follows from or is caused by another part.[2] A movement that may appear to be a cycle but has no logical explanation for its existence is due to chance, or

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[1]Foote, R. J. The Statistical Analysis of Cycles or Oscillations in Time Series. United States Department of Agriculture, Bureau of Agricultural Economics, Washington, 1950.

[2]Thomsen, F. L. and R. J. Foote. Agricultural Prices, ed 2, McGraw-Hill, New York, (1952), p. 114.

unexplainable factors and therefore is not predictable. This would not be a true cycle.

(3) <u>Purchasing Power</u>: Purchasing power represents prices after the effects of prices paid by farmers have been eliminated. It is the ability of that commodity to purchase items commonly used by farmers in the process of production and family living.

PART I

MAJOR MICHIGAN FARM CROPS

Upon close observation of prices of the major Michigan
field crops, namely Corn, Barley, Oats, Winter Wheat, and
Rye from 1910-1952, it is evident that their trends and
fluctuations about the trend are very similar. This is
not altogether unexpected since they are partially substi-
tutable as feeds and the markets for each are fairly broad.

In all cases there has been a gradual trend towards
higher prices which is probably accounted for by the
general price rise of recent years, and to a lesser
extent, by the actions of the Commodity Credit Corporation
to support farm prices. Although the fluctuations of prices
around the trend vary in magnitude, there appears to have
been four major periods of rising prices following periods
of low prices. These periods of rising prices were from
1917-1919, from 1924-1929, from 1934-1937, and in 1947.

The relatively high prices for these crops from
1917-1919 were due to the general price rise experienced
after World War I and also to the increased demand for
feed required for the increased livestock numbers during
this period (See Fig. 27, p. 61). The price rise of

1924-1927 appears to be accounted for largely by the general business recovery after the price recession of 1921 and also by the short crop years of 1924 and 1927. The rising prices of 1934-1937 possibly were a result of a series of short crops during this time which caused a shortage of supply on the market, coupled with the inflationary policies of the New Deal Administration. The last great price rise up to 1947 apparently was a result of World War II with its accompanying general price rise and greater demand for feed to raise the increased numbers of hogs and cattle.

Thus far only price movements have been mentioned to the exclusion of purchasing power, production, and yield trends. In order to better describe these trends, each product will be considered separately and for each product, prices, purchasing power, production, and yield will be discussed in that order.

Corn

Prices and Purchasing Power. The trend in prices of
corn is best represented by the curved trend line which
indicates a decrease in corn prices from 1910 to 1925 with
a rather strong price rise since then. This gradual decline
in corn prices from 1910-1925 may be accounted for partly
by four large corn crops in the United States from 1920-1923,
which depressed the price considerably when marketed. This
period coincided with a general price recession following
World War I so that these factors may be largely responsible
for the downward trend during this period. (See Fig. 1)

From 1925 to the present, there was at first a gradual
price rise and since 1939 a rather strong upward trend.
This upward trend is influenced primarily by the abnormally
high prices of World War II, and by the government price
support programs since 1933.[1] During the entire period,
there were two violent downward fluctuations -- in 1931
and in 1938 -- which appear to have been due in part to
the concurrent business recessions that struck the country
at this time.

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[1]The extent of the government price support programs in
maintaining higher corn prices is best illustrated by
the annual committments of the Commodity Credit Corporation.
See Appendix B, Table XXV.
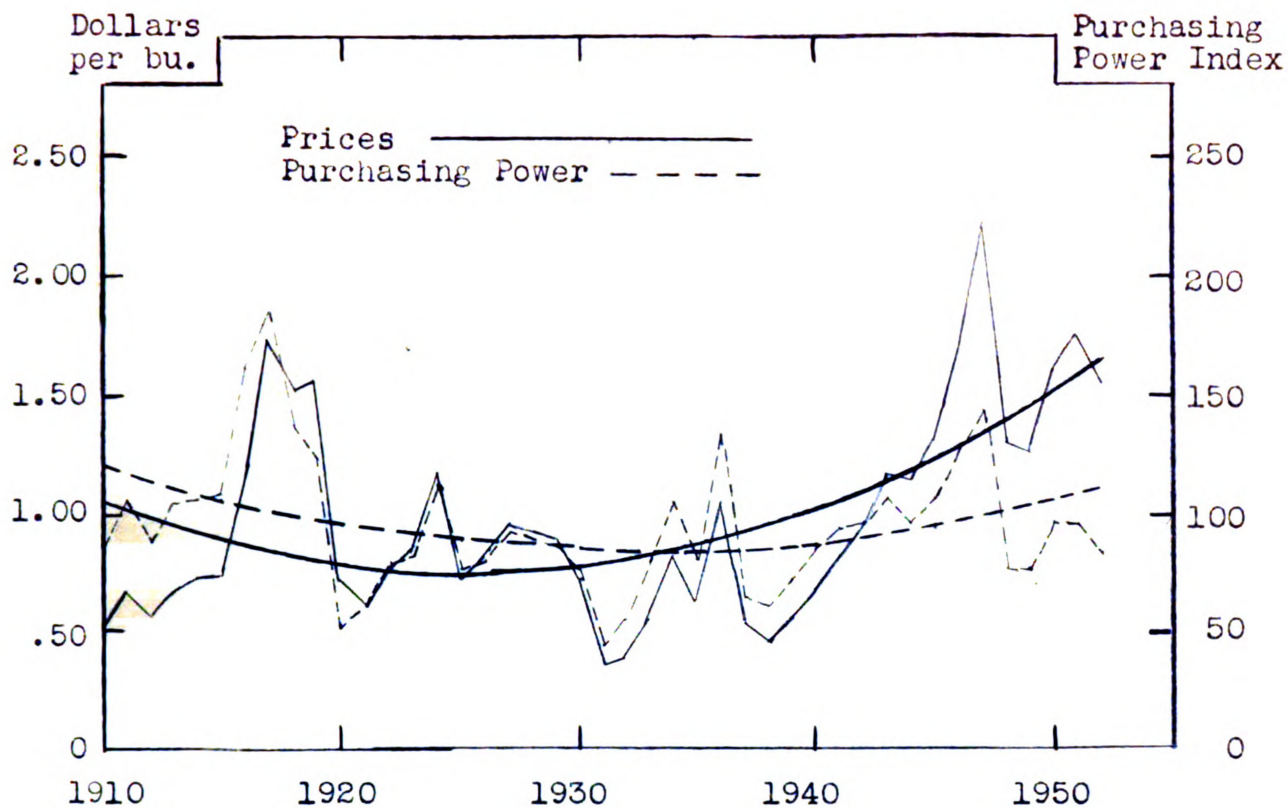
Figure 1.   CORN: Trends in Prices and Purchasing Power, 1910-1952.
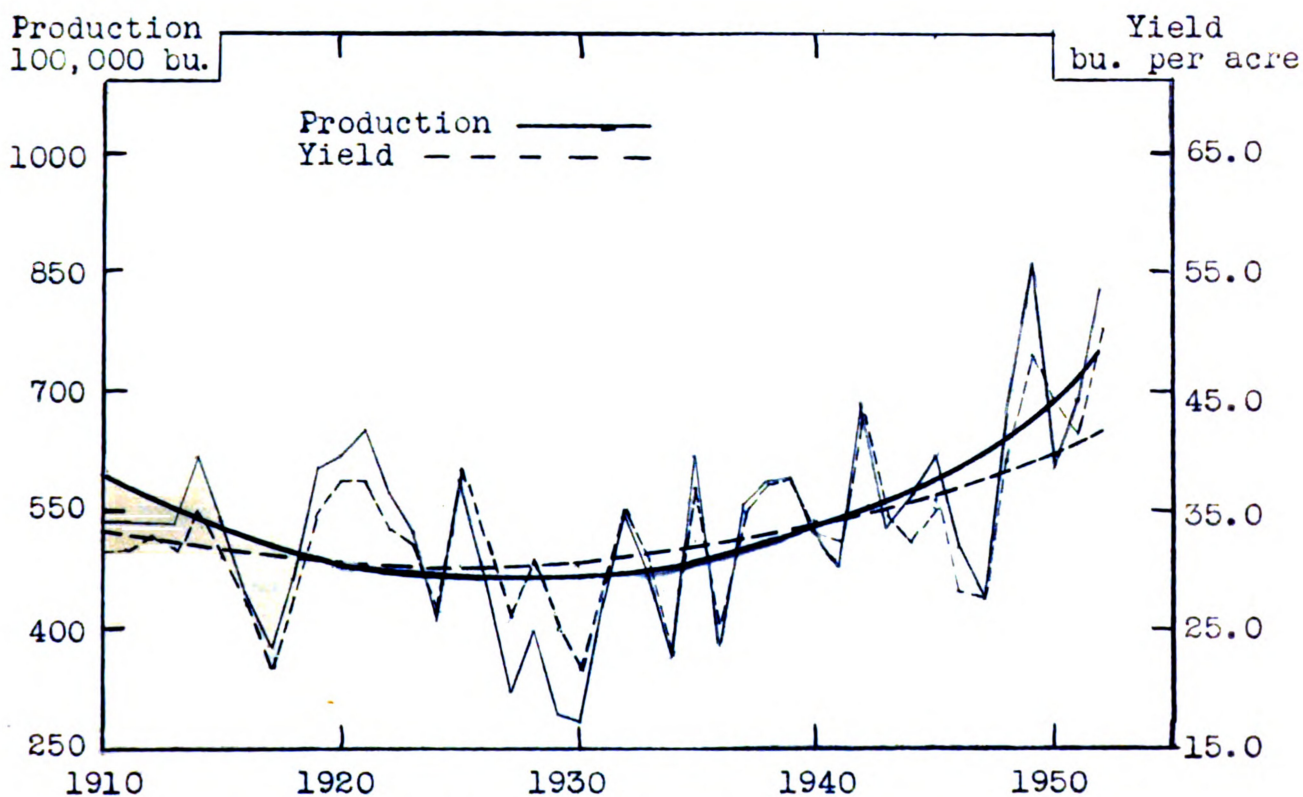
Figure 2.   CORN: Trends in Production and Yields, 1910-1952.

Comparing prices with purchasing power it is seen that the trend of corn prices was seriously affected by two world wars. The trend of purchasing power indicated an overall decline since 1910, although in recent years purchasing power rose slightly. This general decline in purchasing power probably was a reflection of changing economic conditions that raised the prices of things farmers usually buy.

In general the inflation of two wars, the number and prices of livestock, and the total United States production of corn and other grains, appear to have been the most significant factors affecting corn prices.

Production. The trend of production of corn is best represented by a curved line, which indicates a decrease in production of 13 million bushels of corn in Michigan from 1910 to 1929, and since then a gradual increase in production of 33 million bushels up to 1952. (See Fig. 2)

The most significant factor affecting this initial downward trend in production from 1910-1929 appears to have been the reduced acreage of corn. In 1920, 1,781,000 acres of corn were harvested as compared with 1,197,000 acres in 1929. This reduction in acreage of corn harvested apparently was the main factor in lowering production during this period.

The following upswing in the trend of production from
1929 to the present time probably was due to two factors.
The first of these was the increased yield due to the
advent of hybrid seed which had come into wide use in
Michigan by 1940. This factor, along with a gradual
increase in corn acreage accounted for the first part of
this upward production trend. The second part of the
upward trend, since 1943, probably was due to an unusual
increase in acreage which reached a peak of 1,805,000
acres of corn harvested in 1944.

In summary, the more important factors affecting the
trend of production of corn have been acreages harvested,
the increased yields due to the use of hybrid seed corn,
and the high price guaranteed for corn by the government
through arrangements by the Commodity Credit Corporation.

Yield. The trend in the yield of corn from 1910-1952
was best represented by a slightly curving line. Corn
yields experienced a very slight downward trend from 1910
to 1930 reflecting the low yields in a number of years
during this period. Weather conditions such as a late
spring, drought, and frost undoubtedly played a great
part in accounting for the abnormal downward fluctuations
in yield which occurred during this period. (See Fig. 2)

During the depression, yields remained relatively
low. This could have been due to the reduced fertilizer
consumption from 1931 to 1936 (Appendix B, See Table XXIV,
p. 177), and also to an increasing tendency on the part of
farmers to use their own seed during the depression years.

The gradual upswing in the trend of corn yields since
the depression appears to have been a reflection of the
large number of good corn years since 1937, an increase
in the amount of fertilizer used, and an increase in the
use of hybrid seed.

In summary, trends in the yield of corn have been
influenced primarily by the changing fertilizer consumption,
the varying weather conditions, and the advent of hybrid
seed corn.

Oats

Prices and **Purchasing Power**. There was little change
in the trend of oat prices from 1910 to 1935, although it
was slightly downward. This probably was a result of the
depression of the 1930's, and also a result of the shrinking
demand for oats as a feed for horses, since the numbers of
horses and mules were declining rapidly during this period.

Since 1935, the trend has been towards higher prices,
which probably was a reflection of the rising general price
level during World War II, and the action of the government
in supporting the price of oats since 1945.[1] Oat prices
seemed to be affected by changes in corn prices since the
two grains can be used to some extent as substitutes in
livestock rations. For this reason oat prices tend to
follow the general trend in corn prices.

In general oat prices in Michigan have been affected
by the general price level, the number of horses and cattle
on farms, the total United States production of oats grown
for sale, and also by the prices of corn and barley.

The trend of purchasing power resembles rather closely
that of prices. The major difference is that for purchasing

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[1]See Appendix B, Table XXV.
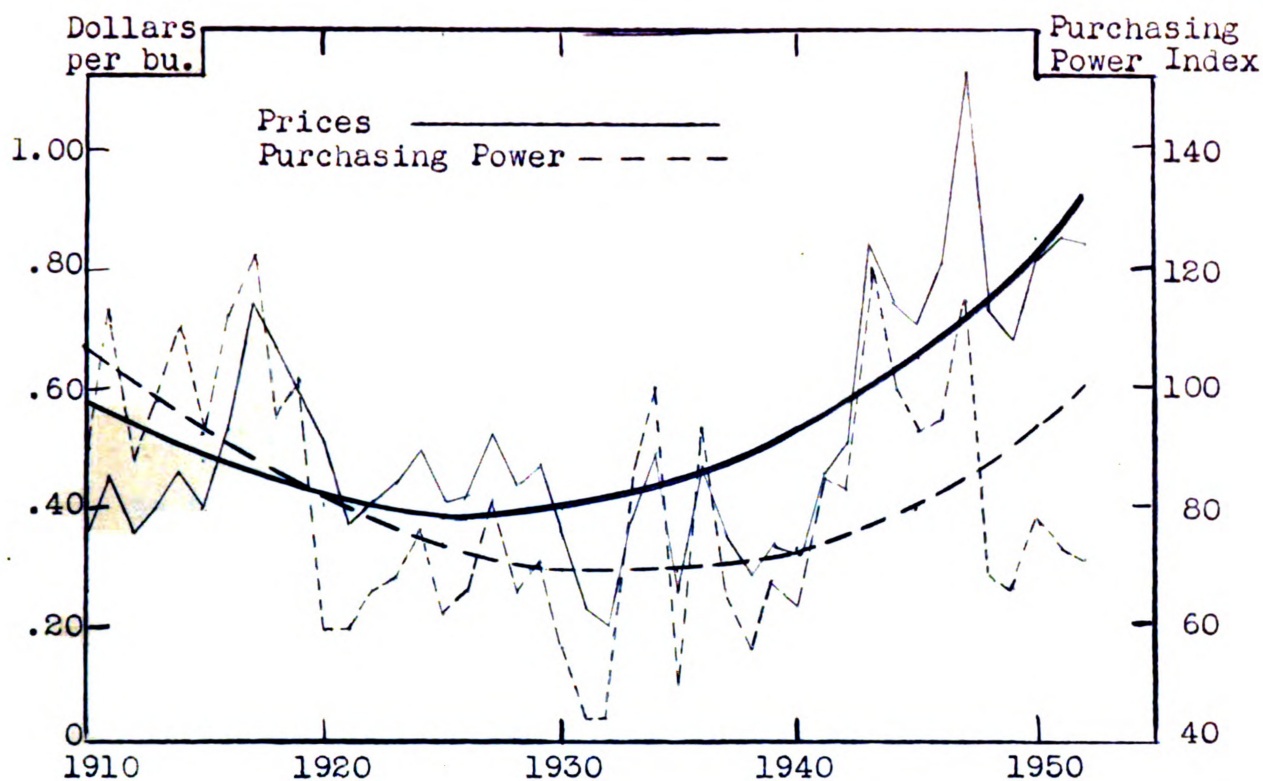
Figure 3.   OATS: Trends in Prices and Purchasing Power, 1910-1952.
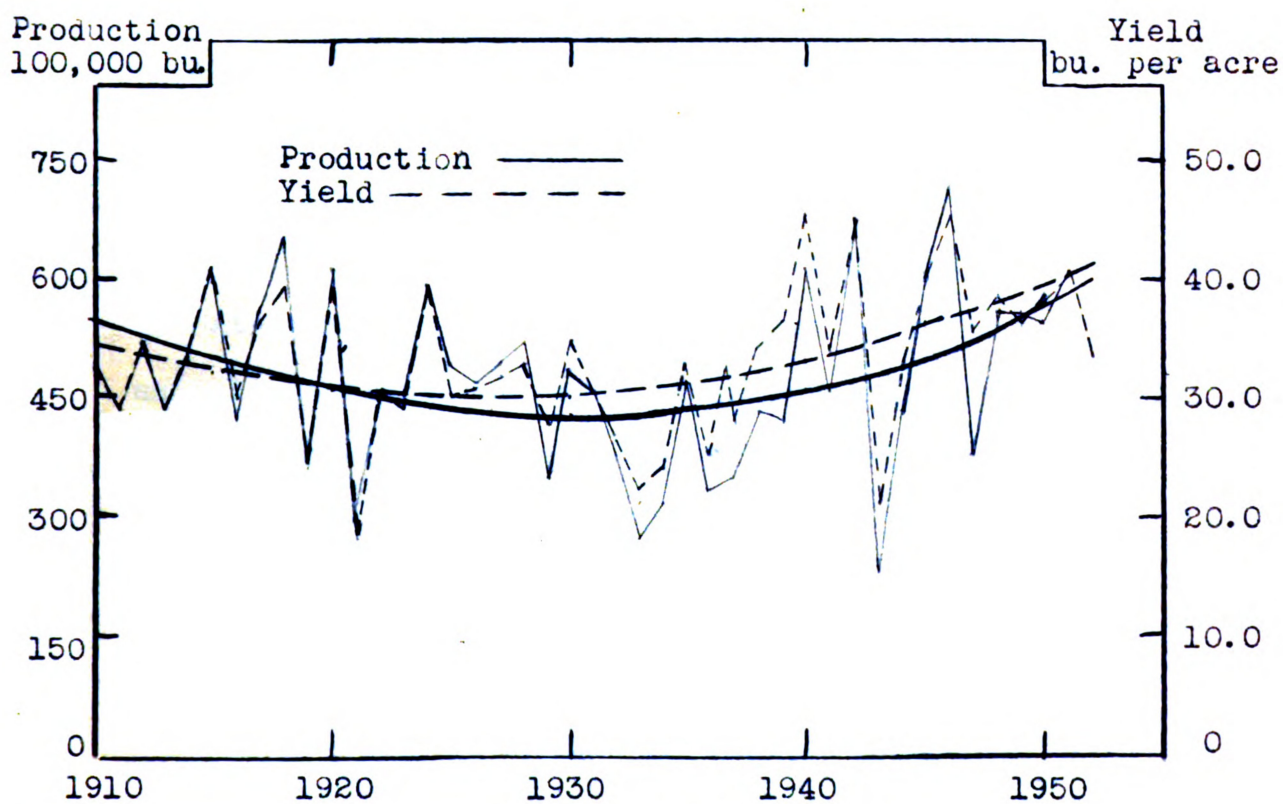
Figure 4.   OATS: Trends in Production and Yields, 1910-1952.

power the influence of prices paid by farmers has been eliminated. Therefore, it shows more clearly the effect of the decreasing numbers of livestock from 1910 to 1935 in causing lower oat prices.

The upswing in the trend of purchasing power from 1935 to the present time appears to be accounted for to some extent by the interrelation of oat prices with rising corn prices. The increasing livestock numbers and the higher prices of livestock increased the demand for corn, and probably has been associated with the upward trend in purchasing power of oats.

Production. The trend in the production of oats indicates a drop in production between 1910 and 1930 of 11 million bushels. This was a reflection of a slow decline in acreage from 1918 to 1928 followed by a rapid decline from 1928 to 1940. This decline in the acreage of oats was associated with a decrease in the numbers of animals on farms, and with an increase in the production of certain other field crops, notably, barley and field beans. At the same time that acreage was decreasing, yields were also low; partially accounting for the declining production trend during this period. (See Fig. 4)

The rather strong upward trend in production from 1930 to the present appears to have been a product of increasing yields due to new, improved varieties, and the use of fertilizer. Production rather closely followed fluctuations in yields, so that this factor along with a four-fold increase in the use of fertilizer between 1930 and the present time, probably accounted to a considerable extent for the upward trend in production.

In summary, the trend of production of oats has been associated with variations in acreage harvested, variations in yields, and with the increased use of fertilizer.

Yield. The gradual downward trend in yield from 1910 to 1930 was due to the practice of using home grown seed rather than improved varieties from certified stock. This resulted in disease and lodging of oats, which held yields down during this period. (See Fig. 4)

Following 1930, there was a gradual upward trend in yield that became increasingly apparent in recent years. These higher yields can be accounted for by several factors. There has been an increased use of certified, improved varieties of seed having more resistance to disease and less tendency to lodge. The introduction of more machinery and the wider use of the tractor has meant that less time

is required to get the crop sown. These factors along
with substantially increased fertilizer applications during
this period appear to have accounted largely for the upward
trend in yields during recent years.

In summary, yields of oats appear to have been sig-
nificantly increased in recent years by the type of seed
used, the improved cultural practices, and the heavier
applications of fertilizer.

Barley

Prices and Purchasing Power. The trend in barley
prices was similar to those of oats and corn, indicating
that these feed grains are influenced by many of the same
factors. In the case of barley, as in oats and corn, there
was a declining trend in prices from 1910 to 1930. This
may be accounted for partially by three large crops in
1918, 1920, and in 1928. This increased supply, combined
with a diminished demand for barley (due to declining
livestock numbers and the loss of the brewers' market
during prohibition) probably was responsible for the
declining trend in barley prices during this period.

Since 1930, there has been a steadily rising trend
in prices. This was largely due to a substantial reduction
in barley acreage during this period, which temporarily
reduced the supply of feed grains during a time when
demand was rising rapidly as a result of increasing
cattle numbers. A second factor of some importance was
the action of the government in supporting the price of
barley since 1940, and particularly from 1948 to 1951.[1]

In summary, the most significant factors affecting
the trend in prices of barley appears to have been the

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[1]See Appendix B, Table XXV.

Figure 5. BARLEY: Trends in Prices and Purchasing Power, 1910-1952.
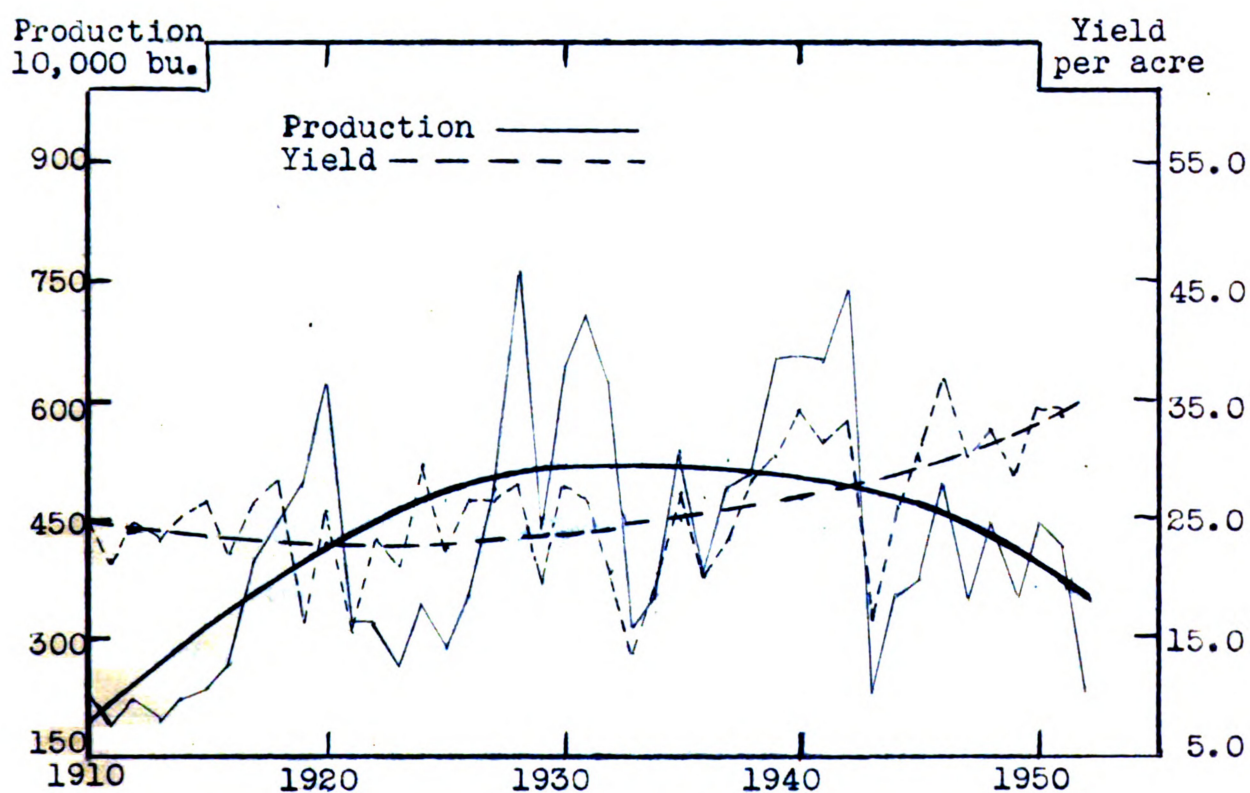
Figure 6. BARLEY: Trends in Production and Yields, 1910-1952.

prices of other feed grains, the number and prices of livestock, the United States production of barley, the quantities used for commercial purposes, and the price support program of the government.

The trend in purchasing power was of the same general nature as the price trend except that there was an initial gradual decline in purchasing power followed by only a slight increase during the war years. (See Fig. 5)

The long period of declining purchasing power from 1910 to 1936 probably was a reflection of a lower demand for barley due to reduced animal numbers, and lower animal prices. At the same time, production of barley was rising not only in Michigan, but in the United States.

The upward trend in purchasing power since 1936 probably was due to the combination of a declining supply caused by the reduced production, and to an increasing demand for barley as a feed for the greater numbers of livestock raised during this period and for malting by the brewing industry.

Production. The trend in production was closely associated with the number of acres harvested. Acreages were generally high from 1918 to 1942, and very low before and after this period. This would account in large part

for the upward trend in production experienced from 1910 to 1934, and the downward trend since that time.

In summary, the more important factors affecting the trend in production of barley appear to have been acreages harvested and price of barley.

<u>Yield</u>. The initial downward trend in barley yields reflects several years of low yields, notably 1919, 1921, and 1929, when adverse weather conditions resulted in abnormally low yields of barley. (See Fig. 6)

The trend in yields increased substantially since 1930 in spite of unusually low yields in 1933 and in 1943. An important factor accounting for this increase has apparently been improved varieties of barley and heavier applications of fertilizer since 1934. The use of better seed and greatly improved cultural practices were also important.

Probably the more important factors affecting yields have been the weather, the use of improved seed, and the greater use of fertilizer in the production of barley.

Winter Wheat

Prices and Purchasing Power. A large volume of soft
winter wheat is consumed domestically so that during years
of low production, Michigan soft winter wheat prices are
established primarily by factors in the United States.
However during years of high production, when more wheat
must be put on the world market, Michigan prices are
associated to a greater extent with world wheat prices.
The basic factor causing price fluctuations was therefore
the instability of production in comparison with domestic
and foreign demands.

The movements of Michigan winter wheat prices followed
rather closely the fluctuations in the general price level.
This is quite evident upon comparing the purchasing power
of wheat with actual wheat prices. The purchasing power
series exhibits relatively narrower fluctuations. Although
the trend of purchasing power of wheat is represented by
a curve, a gradual overall decline is noticeable since 1910.
This may possibly be accounted for by the general economic
changes during the past few years which raised the index
of prices paid relatively more than wheat prices.

Although Michigan soft winter wheat prices fluctuated
widely during the past 42 years, a very distinct downward

Figure 7.   WINTER WHEAT: Trends in Prices and Purchasing
            Power, 1910-1952.
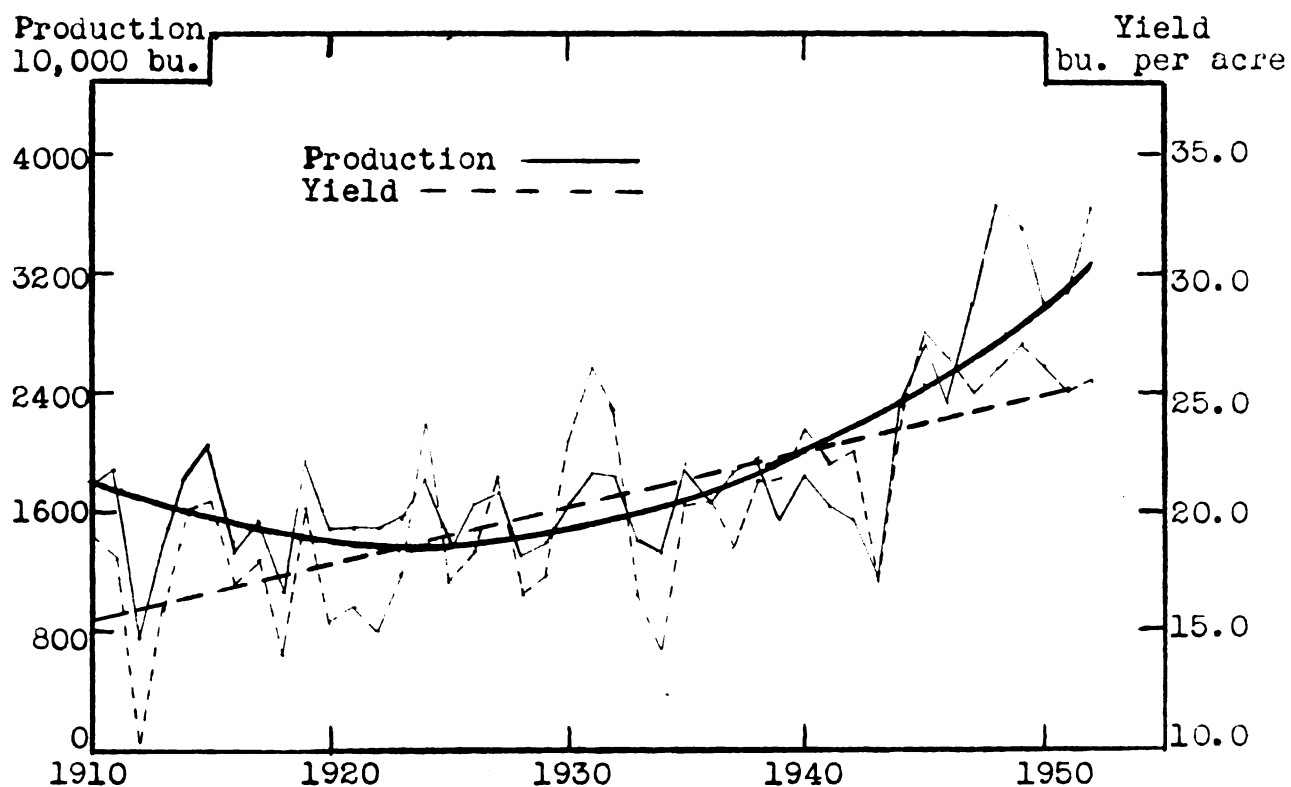
Figure 8.   WINTER WHEAT: Trends in Production and Yields,
            1910-1952.

trend is noticeable from 1910 to 1930. This apparently
was associated with high wheat prices during World War I
which resulted in a sudden increase in acreage in the
early twenties and consequently a flooded wheat market
in succeeding years. This excessive supply, when combined
with the reduced demand for wheat following World War I,
was the important factor causing this initial downward
trend in Michigan soft winter wheat prices. (See Fig. 7)

The strong upward trend from 1930 to the present time
was marred by two serious downward fluctuations in 1930-31
and in 1938. One factor which probably influenced this
upward trend in prices was actions taken by the Commodity
Credit Corporation since 1938 to maintain wheat prices
at the prescribed support level.[1] These actions were
particularly important during the years of the second
world war and the Korean War.

A second factor causing the upward price trend was
the result of high demands caused by World War II. This
is partially reflected in the government price support
program which was trying to increase the production of
wheat during the early years of World War II.

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[1]See Appendix B, Table XXV.

In summary, the more prominent factors affecting price trends in Michigan winter wheat apparently were the United States and the world wheat situations, the general price level, and the government price support program.

Production. Although the trend indicates a steadily rising rate of production of winter wheat in Michigan since 1924, it is only since 1943 that there has been any appreciable upward movement in production. (See Fig. 8)

During the period 1910 to 1943 there was a gradual decline in acreage, which appears to have been offset by an increase in yield. The net result of these two opposing factors was to hold production nearly constant during the entire period. The gradual increase in production shown by the trend line since 1924 was due mainly to the rapid increase in production during and following World War II. The increased production is a result of a tremendous increase in acreage since 1943, which apparently is due to the high wheat prices of these years. This increase in acreage along with higher yields influenced production considerably.

In summary, variation in acreage, yields, and the government price support program appear to have been the main factors influencing the trend in production of Michigan winter wheat.

Yield. Winter wheat yields experienced a steady increase from 1910 to the present time. This trend was stronger for Michigan than for the United States as a whole. This can be explained in part by the fact that the weather in Michigan is less of a limiting factor than it is in the leading wheat states, and as a result yields have been consistently higher and more stable. (See Fig. 8)

The upward trend in Michigan yields appear to have been the result of a series of significant factors. The first of these is the greatly increased fertilizer consumption, especially since 1934.[1] A second is the use of more improved varieties of wheat, which are disease resistant and higher yielding. Also, the increased use of certified seed and improved cultural practices have raised yields considerably.

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[1]See Appendix B, Table XXIV.

Rye

Prices and Purchasing Power. The price of rye has
followed closely the movements in the price of wheat in
Michigan. The distinct downward trend from 1910 to 1930
probably was due in large part to the loss of the European
export market which purchased 53 percent of the United States
rye crop from 1918 to 1922. This caused an oversupply of
rye in United States immediately after this period which
depressed rye prices considerably. (See Fig. 9)

The rise in the trend of rye prices after 1930 was
again closely associated with a similar rise in wheat prices.
As with wheat prices, the price of rye was really lower than
the trend indicates from 1930 to 1940. However, from 1940
to 1947 the price of rye had risen by six times, thus
accounting for the strong upswing in the price trend.
The rise in prices during this period was a result of
very low acreages and consequently a reduced supply of
rye. A second significant factor causing this upswing
in price was the government price support program which
has been made effective through nonrecourse loans and
purchase agreements by the Commodity Credit Corporation.[1]
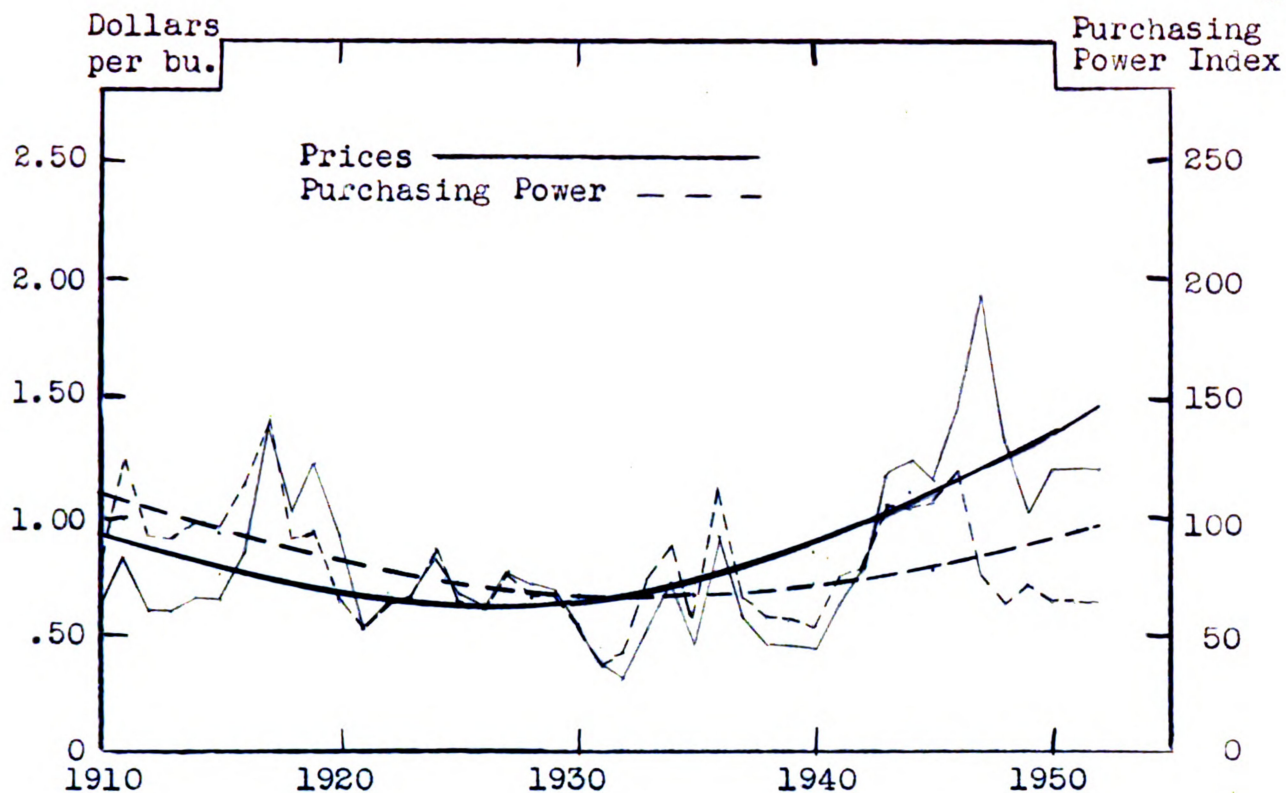
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[1]See Appendix B, Table XXV.
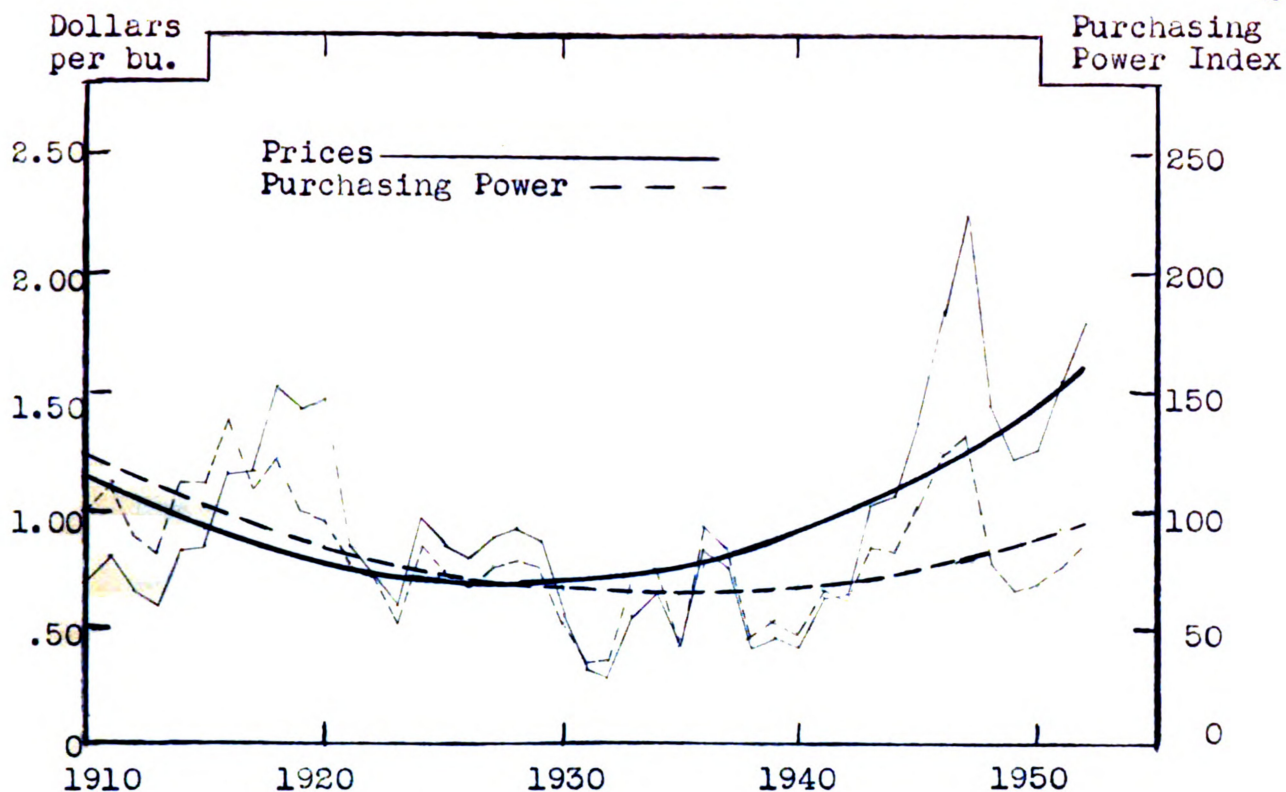
Figure 9.   RYE: Trends in Prices and Purchasing Power, 1910-1952.
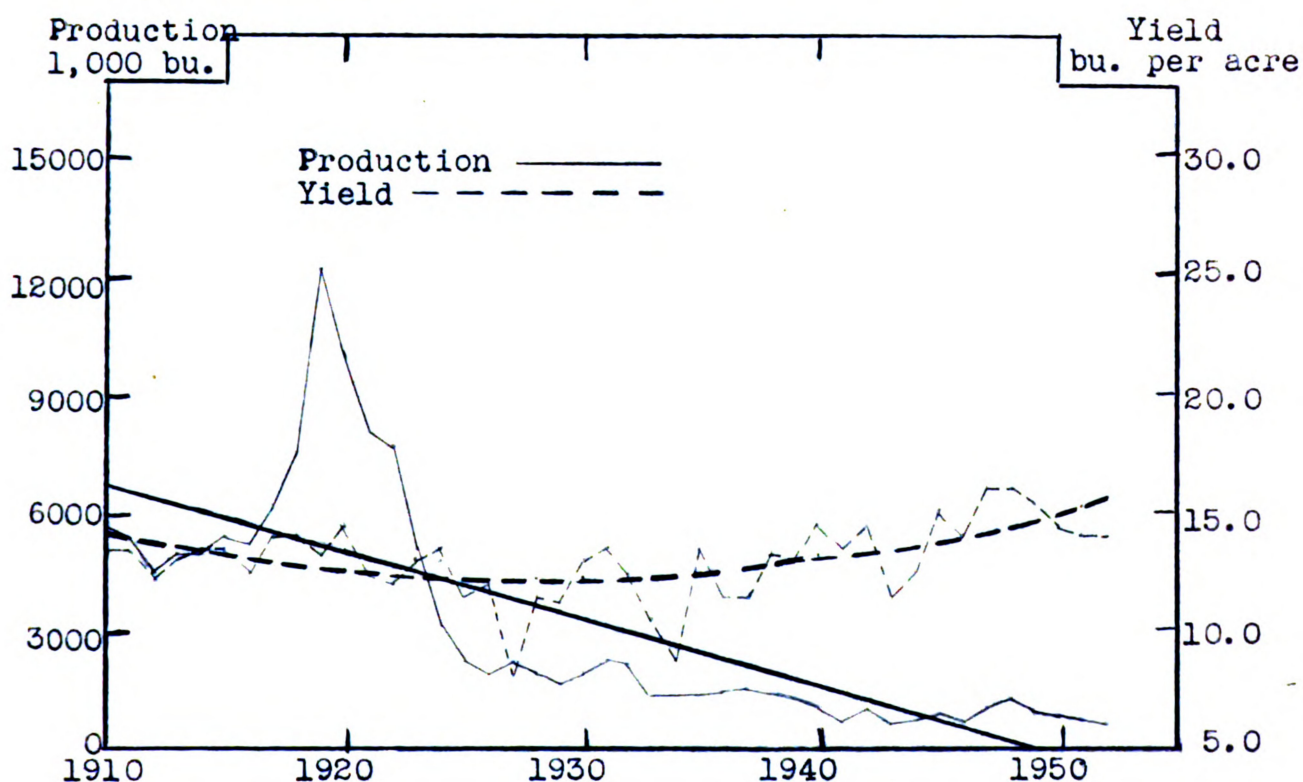
Figure 10.   RYE: Trends in Production and Yields, 1910-1952.

From the purchasing power series it is evident that other prices have been rather important in magnifying the amplitudes of fluctuations in rye prices, and have thus exaggerated the apparent upward trend in rye prices. The slight downward trend in purchasing power of rye probably was a result of the changing economic conditions which increased prices of other commodities in recent years.

In summary, it appears that the decreased supply of rye due to lower production, the loss of the European export market, and the abnormal prices of two World Wars have been the most significant factors affecting the price of rye.

Production. A very distinct decline in production of rye is quite evident from 1910 to the present time. This strong downward trend was a result of the greatly reduced acreage of rye harvested. Fluctuations and trend in production follows fluctuations and trend in acreage harvested very closely. The initial decline in acreage from 1919 to 1926 probably was a result of the loss of the European export market for rye and the ensuing period of low prices. (See Fig. 10)

In summary, the change in acreage of rye harvested in Michigan appears to have been the most significant factor affecting the production of rye.

Yield. The trend in yields of rye declined gradually from 1910 to 1930 -- a reflection of abnormally low yields in 1925, 1929 and 1934-35. The trend towards lower yields during this period may have been due to a combination of low fertilizer applications, the use of home grown seed, and poor cultural practices. Similarly the upward trend in yield of Michigan rye from 1930 to the present time probably was due to a combination of increased fertilizer applications, the use of improved varieties of seed, and improved cultural practices. The trend in yield of rye does not appear to be attributable to any one single factor but is the result of the influence of a combination of all three factors.

Buckwheat

Prices and Purchasing Power. Buckwheat is a relatively
unimportant crop in Michigan and in United States as a whole.
Since the market is narrow, the price is dependent more upon
local production, local demand, and the price of feed and
flour crops, rather than upon the total United States
production. Changes in buckwheat production have had less
affect on buckwheat prices than production changes of the
more important crops have had upon their prices.

The trend in buckwheat prices was downward from 1910
to 1930, and upward since then. This trend was influenced
primarily by the high prices of two world wars, and the
unusually low prices of the depression during the thirties.
The slight decline in the trend of purchasing power probably
was a result of economic changes which raised the prices of
commodities bought in recent years, and as a result lowered
the purchasing power of buckwheat. (See Fig. 11)

Production. The downward trend in the production of
buckwheat has followed a corresponding downward trend in
acres harvested. Buckwheat is a relatively low valued
crop which may be used as a "catch crop" if the intended
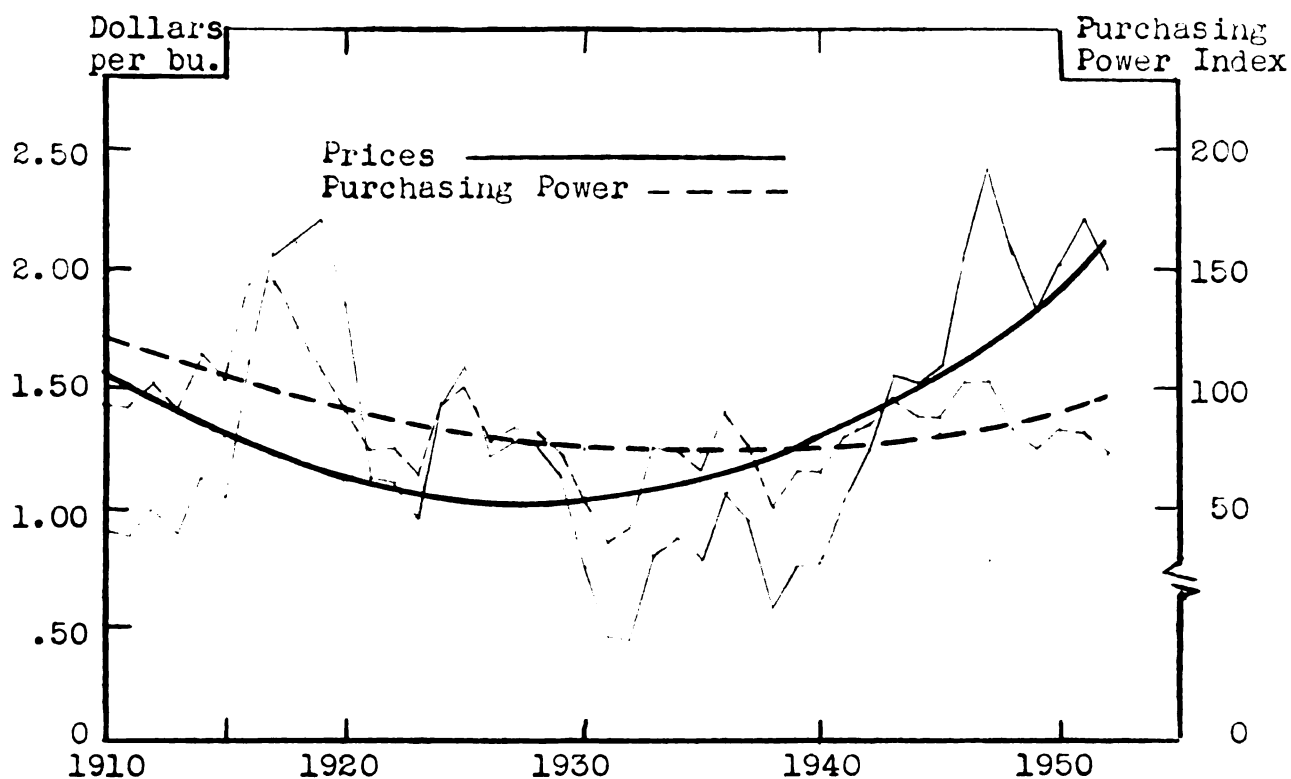crop happens to be a failure during the spring. In recent
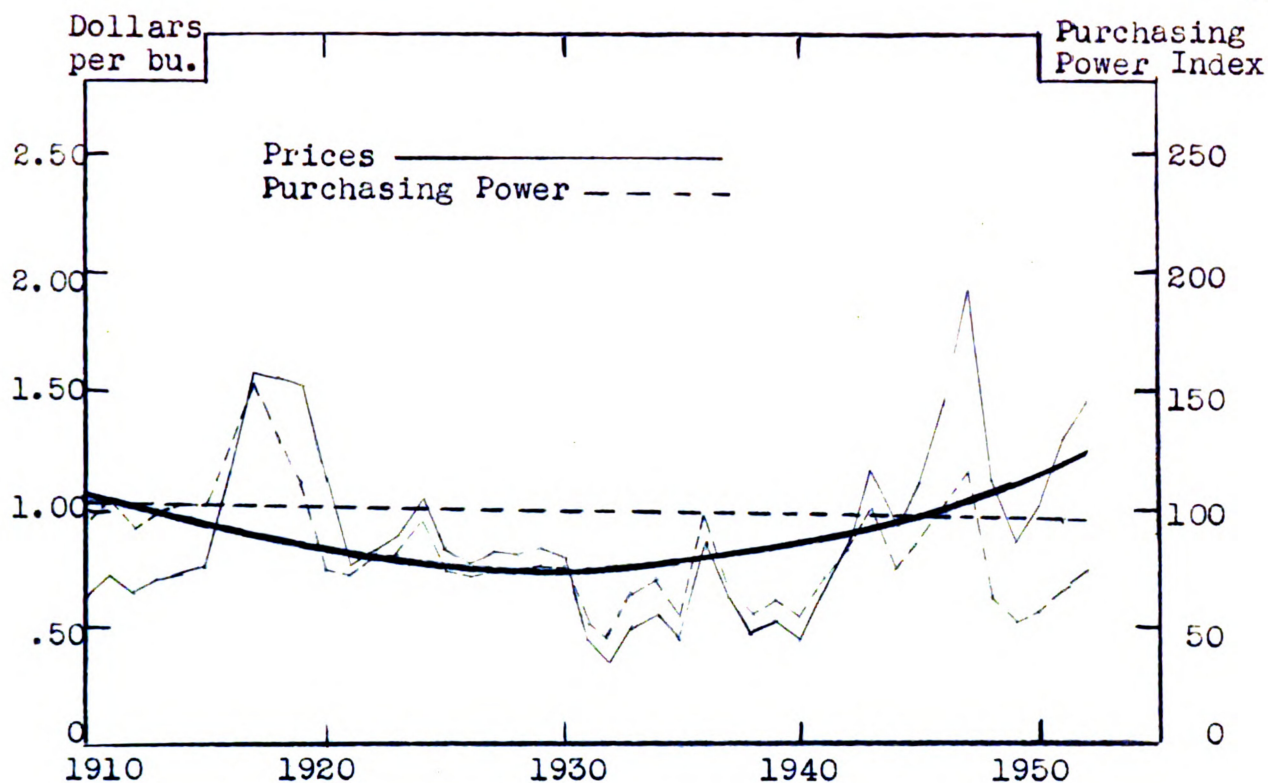
Figure 11.   BUCKWHEAT: Trends in Prices and Purchasing
Power, 1910-1952.
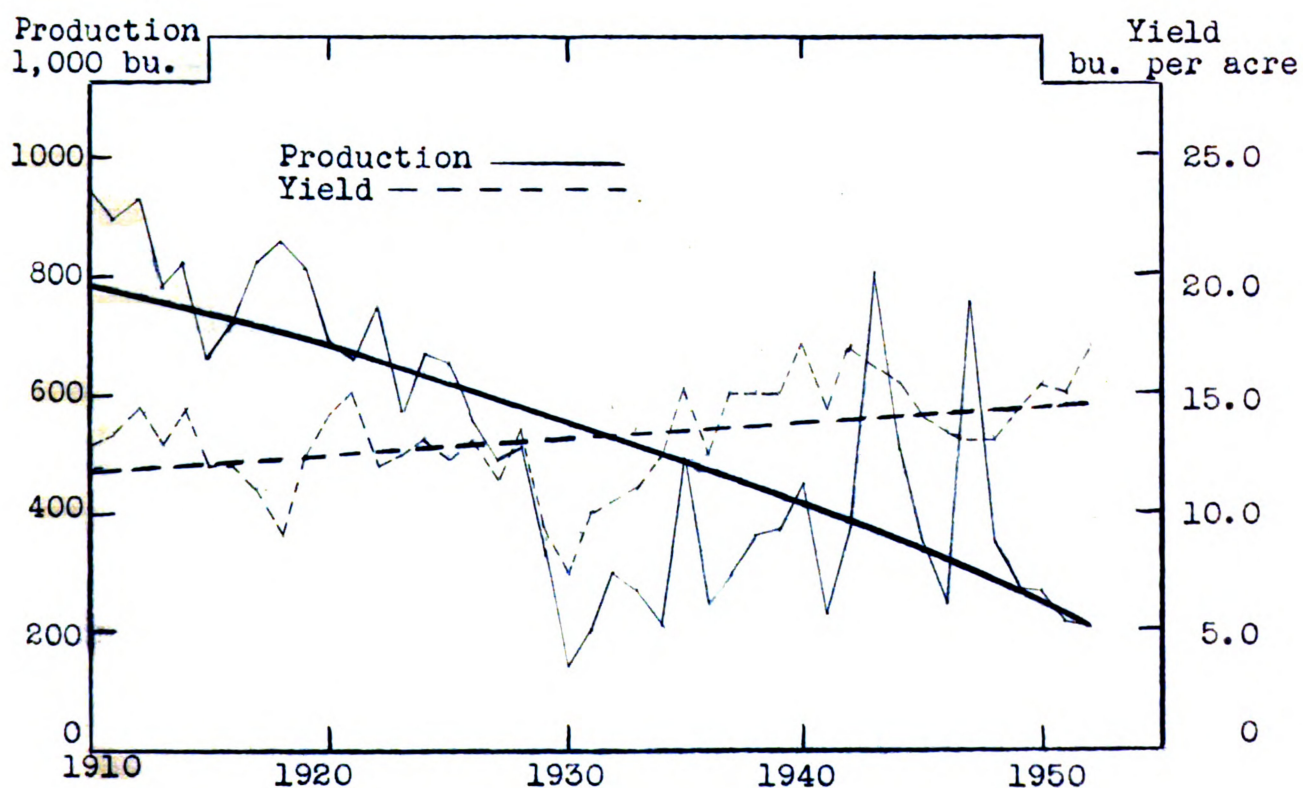
Figure 12.   BUCKWHEAT: Trends in Production and Yields,
1910-1952.

years, climatic conditions have been favorable for the
growth of wheat, corn, oats, and barley, and also the
price of these crops has been high, so that this factor
accounted to some extent for the reduced acreage and also
for the declining trend in production of buckwheat.

In summary, the more important factors affecting the
production of buckwheat have been the changes in acreage
of other more important field crops along with the higher
prices and yield of these crops.

Yield. Buckwheat has experienced a steady upward trend
in yield since 1910, as have almost all other farm crops.
These higher yields are due primarily to the increased
applications of fertilizer particularly since 1934. At
the same time, cultural practices have been greatly improved
with the use of more adequate machinery and the introduction
of new techniques. These factors along with better growing
conditions during recent years, appear to have accounted
in great part for the upward trend in yields of buckwheat.
(See Fig. 12)

All Hay

Prices **and** **Purchasing** **Power.** The strong downward
trend in hay prices from 1910 to 1930 was a result of
unusually high prices during World War I followed by lower
prices from 1922 to 1940. The relatively low prices of
the twenties and thirties do not appear to have been a
result of increased production but rather a result of a
decreased demand for hay. This probably was due mainly
to a reduction in the number of horses and mules during
this period without any very substantial increase in
cattle numbers to offset this reduced demand for feed.

There has been a decided upward trend in hay prices
since 1930, but particularly since 1940. These higher
prices since 1940 apparently are a reflection of greatly
increased cattle numbers which raised the demand for hay.
This increased demand compared with only a small increase
in production, increased hay prices considerably. The
price of hay during this period also appears to have been
closely associated with the generally high prices of all
farm commodities. A second factor accounting for this
upward trend in hay prices was the increased percentage
of hay acreage devoted to alfalfa, which is a relatively
higher valued hay crop.
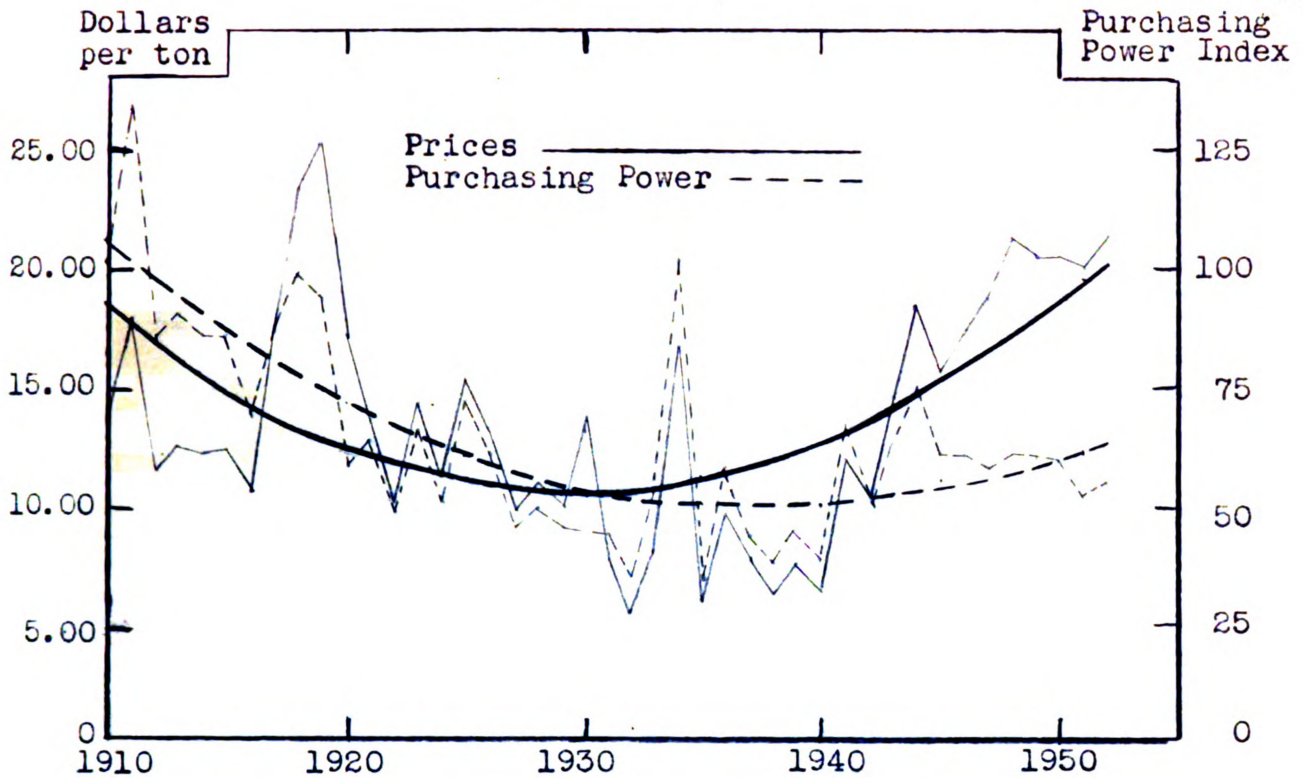
Figure 13.   ALL HAY: Trends in Prices and Purchasing Power, 1910-1952.
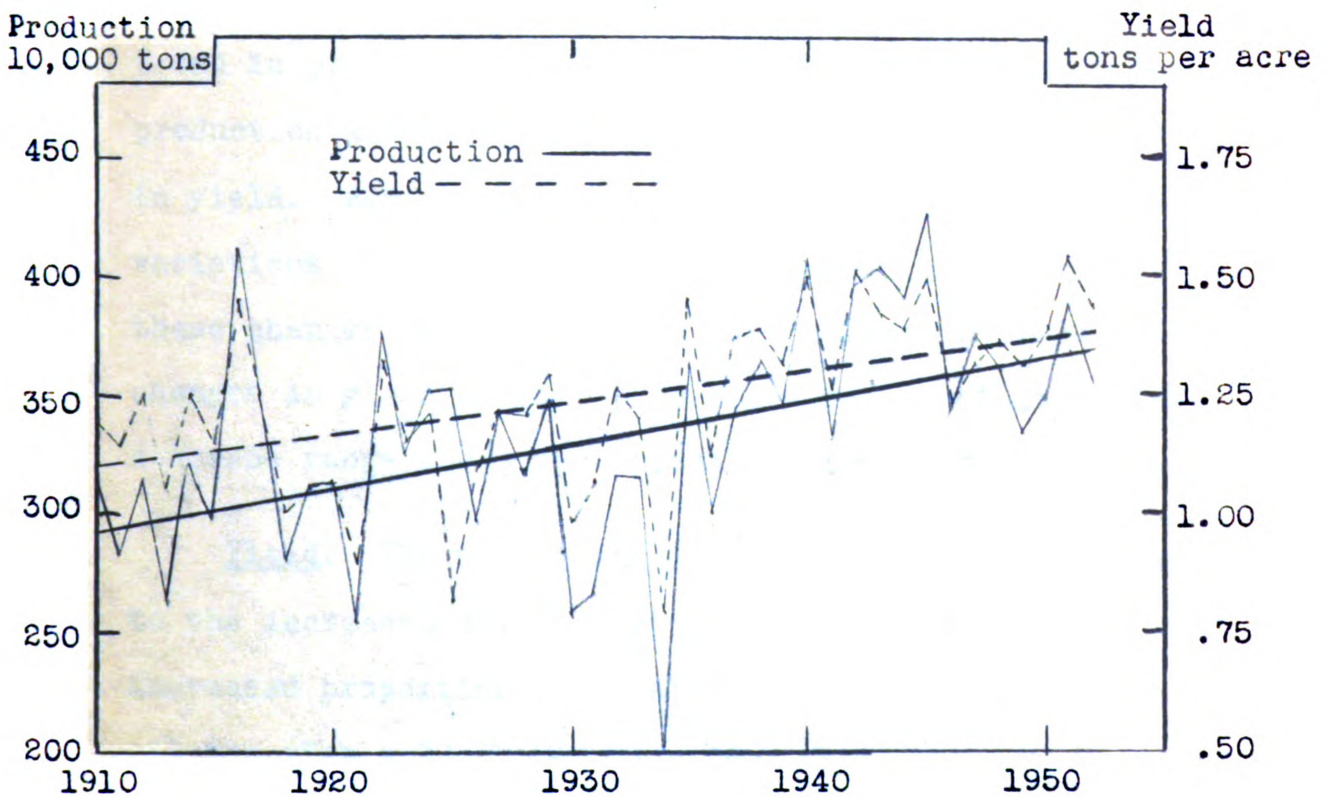
Figure 14.   ALL HAY: Trends in Production and Yields, 1910-1952.

The trend in purchasing power of hay was downward reflecting larger increases in prices of commodities bought by farmers during recent years. (See Fig. 13)

In general, some of the more important factors influencing the trend in hay prices appears to have been variations in demand for hay as a feed for livestock, the price of certain field crops which compete with hay for acreage, and the general price level. It may be interesting to note that since most farmers use hay only as feed, they pay little attention to the price of hay, unless it has to be purchased from an outside source.

Production. Michigan experienced a slowly increasing trend in production of hay since 1910. This increase in production was largely a result of a corresponding increase in yield. Acreage of hayland changed in accordance with variations in cattle numbers and numbers of horses. However these changes in acreage have been offset in large part by changes in yield so that production has fluctuated within a narrow range about the steadily increasing trend line.

Yield. The upward trend in hay yields was due largely to the increased use of fertilizer and to the greatly increased proportion of alfalfa included in the total of all hay (Table I). (See Fig. 14)

TABLE I

Tons of Alfalfa Harvested in Michigan[a]

Year	Tons Alfalfa Harvested	Percent of Total Michigan Hay Tonnage
1920	239,000	7.14
1930	751,000	29.37
1940	2,202,000	54.24
1950	1,962,000	56.13

[a]Compiled from reports in Michigan Agricultural Statistics published by the Michigan Cooperative Crop Reporting Services, Lansing, Michigan.

Potatoes

Prices and *Purchasing* Power. Prices of Michigan potatoes since 1910 have fluctuated widely, largely because of changes in the size of the potato crop, and because of the inelastic supply and demand for potatoes. The relatively low acreage utilized permits potato production to be changed rapidly so that under the influence of high or low prices, acreage and production can be appreciably expanded or contracted in one year. The large changes in acreage combined with wide variations in yield caused production to fluctuate widely. The effects of these fluctuations in production were greatly magnified by the inelastic demand for potatoes in causing wide variations of price.

The downward trend in prices which existed from 1910 to 1924 was a result of low potato prices following World War I. These low prices apparently were a result of greatly increased acreages, which expanded due to the high potato prices of World War I. This resulted in a period of over-production during the early twenties, and together with the price recession in 1921 appears to have been the most significant factors causing the initial downward trend in prices.
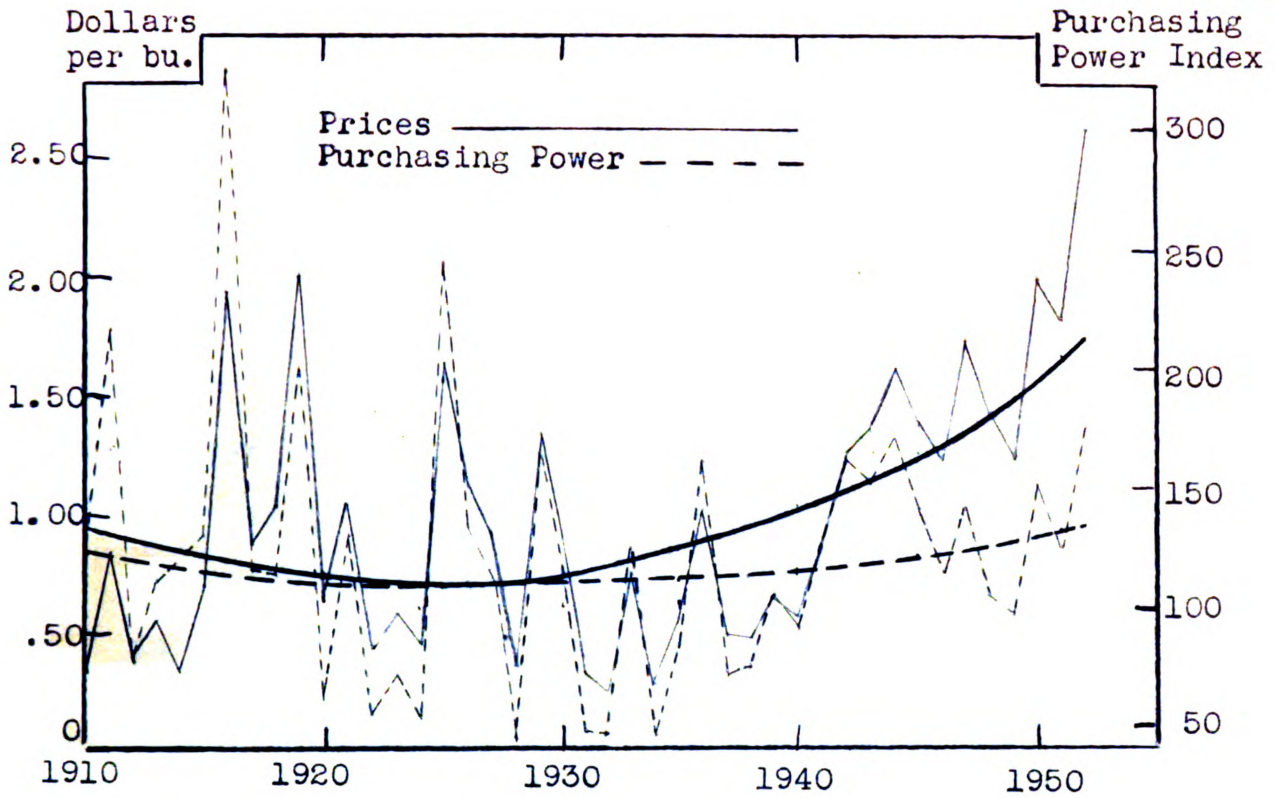
Figure 15.   POTATOES: Trends in Prices and Purchasing Power, 1910-1952.
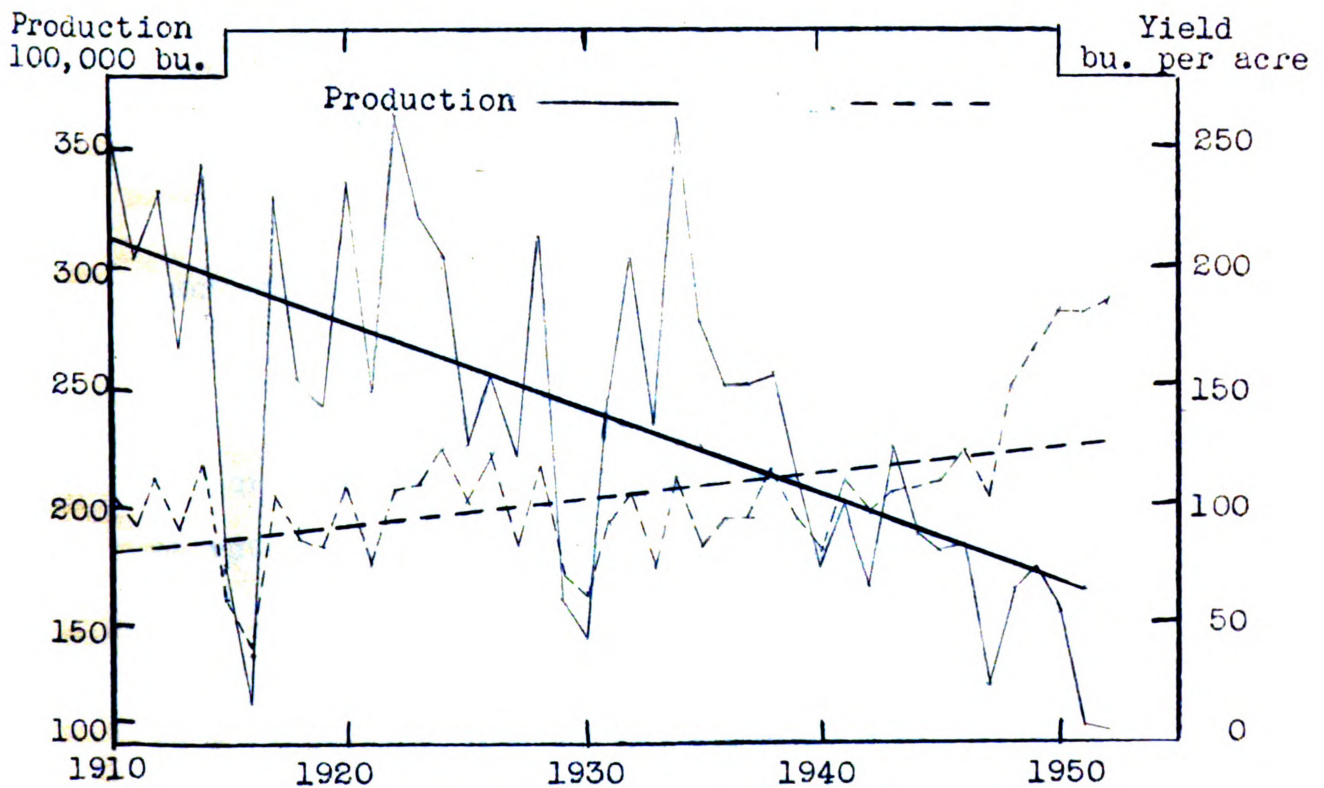
Figure 16.   POTATOES: Trends in Production and Yields of Potatoes, 1910-1952.

Although Michigan potato prices experienced a strong upward trend from 1924 to the present time, higher prices did not begin until 1940. The higher prices of recent years were in part a reflection of a 60% reduction in acreage between 1934 and 1950. This caused a decline in production, which when combined with an increasing demand caused by the rising population and high incomes, resulted in higher prices. A second factor that has been of importance in causing higher potato prices was the actions of the Commodity Credit Corporation since 1943 to maintain potato prices at the government support level.

Wide fluctuations in purchasing power indicate that although the general price level has had some influence on potato prices, this influence has not been as pronounced as in the case of many other commodities. The trend in purchasing power exhibited only a very slight upward movement during the past 43 years. When compared with the downward movement of purchasing power of most other commodities, this would indicate that the real price or value of potatoes remained high, largely as a result of the effects of a higher demand and lower production.

In conclusion, potato prices in Michigan have been affected by the total United States production, by changes in production costs, by the quality of the crop, by changes

in the general price level and business conditions, by
the government price support program, and by potato prices
of other producing states.

Production. The downward trend in potato production
was due to a corresponding downward trend in acres harvested.
Although trend in production and acres harvested was closely
associated, the production trend was tempered somewhat by
the effect of greatly increased yields since 1948. This
reduction in acreage of potatoes was apparently a result
of the increasing profitability of production of other
cash crops.

Yield. The upward trend in potato yields since 1910
was accompanied by progressively reduced fluctuations from
year to year. The declining magnitudes of yield fluctuations
and the gradual upward trend were probably a result of
improved technology and the elimination of marginal growers.
The recent yield increase since 1948 appears to have been
largely accounted for by improved potato seed, treatment
of seed, and the increased use of fertilizer. (See Fig. 16)

Field Beans

Prices and Purchasing Power. The initial downward
trend in prices of field beans from 1910 to 1928 was largely
a result of an extended period of low prices from 1920 to
1928 (See Fig. 17). The high prices of World War I caused
by heavy demands from the armed forces was followed by a
greatly increased acreage of beans in the 1920s. The war
demand had declined substantially by this time, resulting
in a downward trend in prices.

The upswing in the trend of bean prices was influenced
to a great extent by the higher bean prices since 1942.
These higher prices were again accounted for by the heavy
demand for beans by the armed forces during World War II.
Other factors that probably were of significance in explain-
ing this upward trend in bean prices were the stronger
demands for beans for canning purposes and the improved
business conditions during World War II.

The purchasing power of beans exhibited a downward
trend which apparently was a reflection of the changing
economic conditions which raised the level of prices paid
by farmers and in so doing, reduced the purchasing power
of beans grown in Michigan.
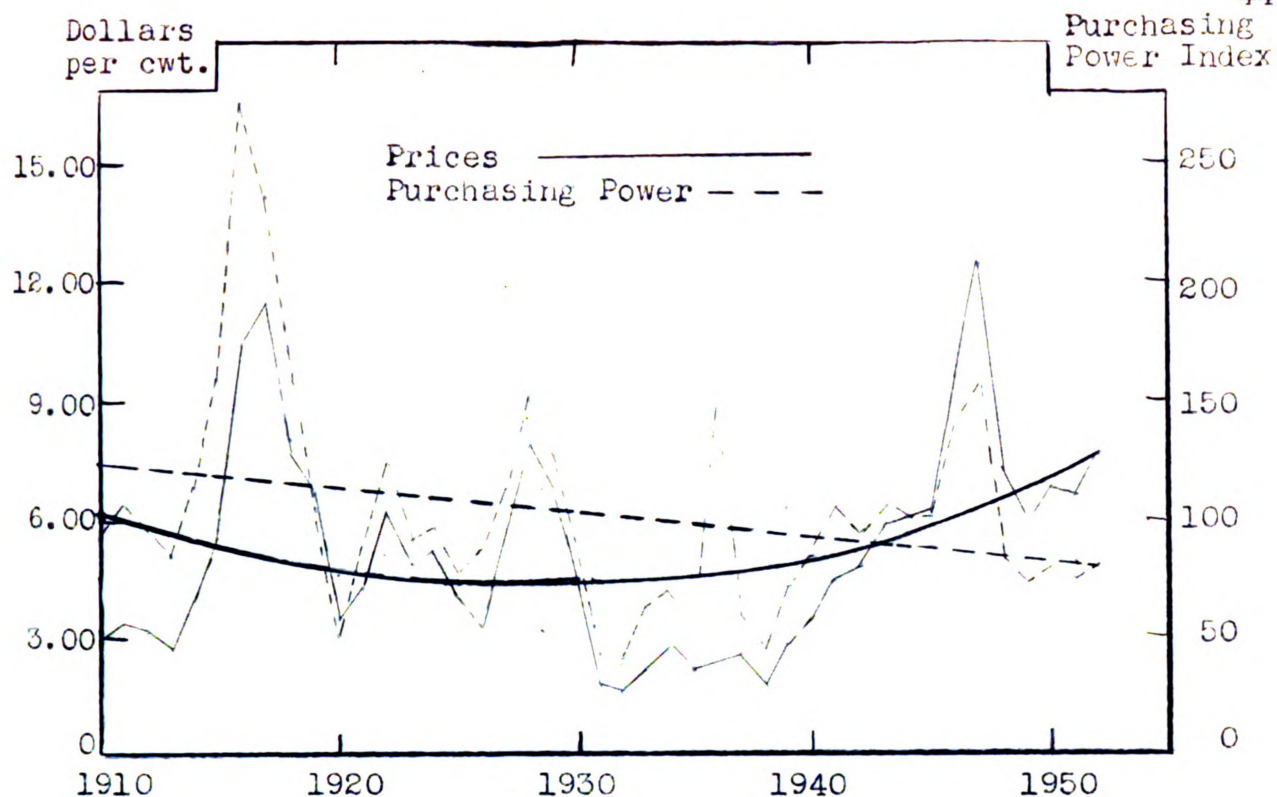
Figure 17. FIELD BEANS: Trends in Prices and Purchasing Power, 1910-1952.
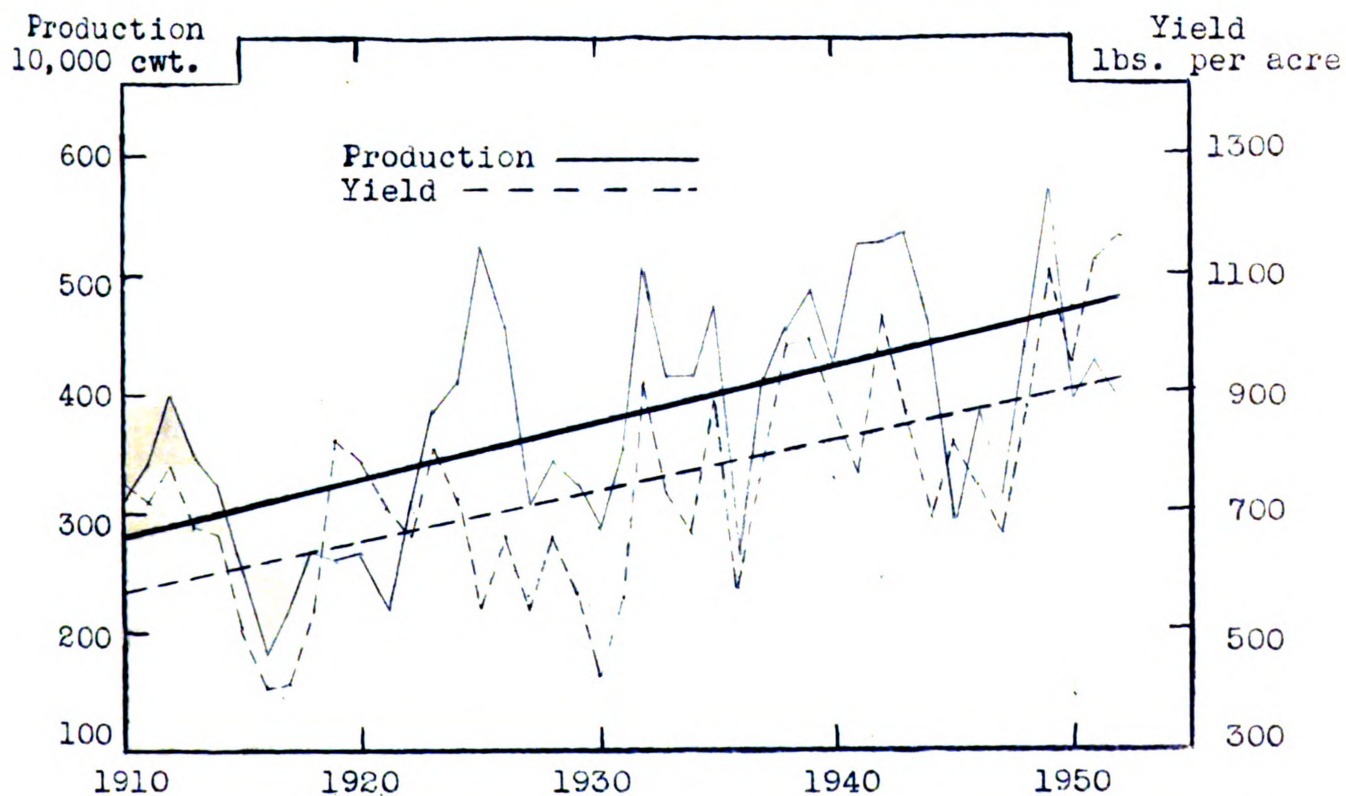
Figure 18. FIELD BEANS: Trends in Production and Yields, 1910-1952.

In summary, the price of beans has been affected by the heavy consumption of beans during war years, the production of beans in Michigan and in the United States, and by changing business conditions.

Production. The steady upward trend in production of beans since 1910 corresponded with a similar trend in yields (See Fig. 18). Although variations in acreage probably influenced production to some extent, the fluctuations in production were closely associated with year to year changes in yield, so that yield has probably been the more significant factor affecting production of beans.

Yield. Although there has been a strong upward trend in yields since 1910, there have been rather wide year to year fluctuations (See Fig. 18). These apparently were a result of changing growing conditions due to variations in the weather. The general upward trend in yield was caused by several factors, of which the more important have been the increased use of fertilizer since 1934, the use of improved seed varieties, and the introduction of new cultural practices and more adequate machinery.

Sugar Beets

Prices and Purchasing Power. The movement of sugar
beet prices indicates an initial downward trend from 1910
to 1923, and since that time a strong rise in sugar beet
prices (See Fig. 19). The upward movement in prices from
1923-1952 was largely a reflection of changes in the
international sugar situation during the years of World
War II. Although Cuba is the main source of sugar imports
for the United States, the Phillipines exported substantial
quantities to this country. During the war with Japan, this
source of sugar was eliminated, and even since the war the
Phillipines have not regained their pre-war status as
exporters to the United States. The ultimate effect has
been reduced sugar supplies in United States and hence
higher sugar beet prices in Michigan as well as in the
entire country.

A second factor that has had some significance in
explaining the higher prices of sugar beets in recent years
was the indirect affect of the Sugar Act of 1946. This
act sets quotas on imports from all foreign countries as
a protection for local producers. At the same time it
subsidizes United States' producers of cane and beet sugar
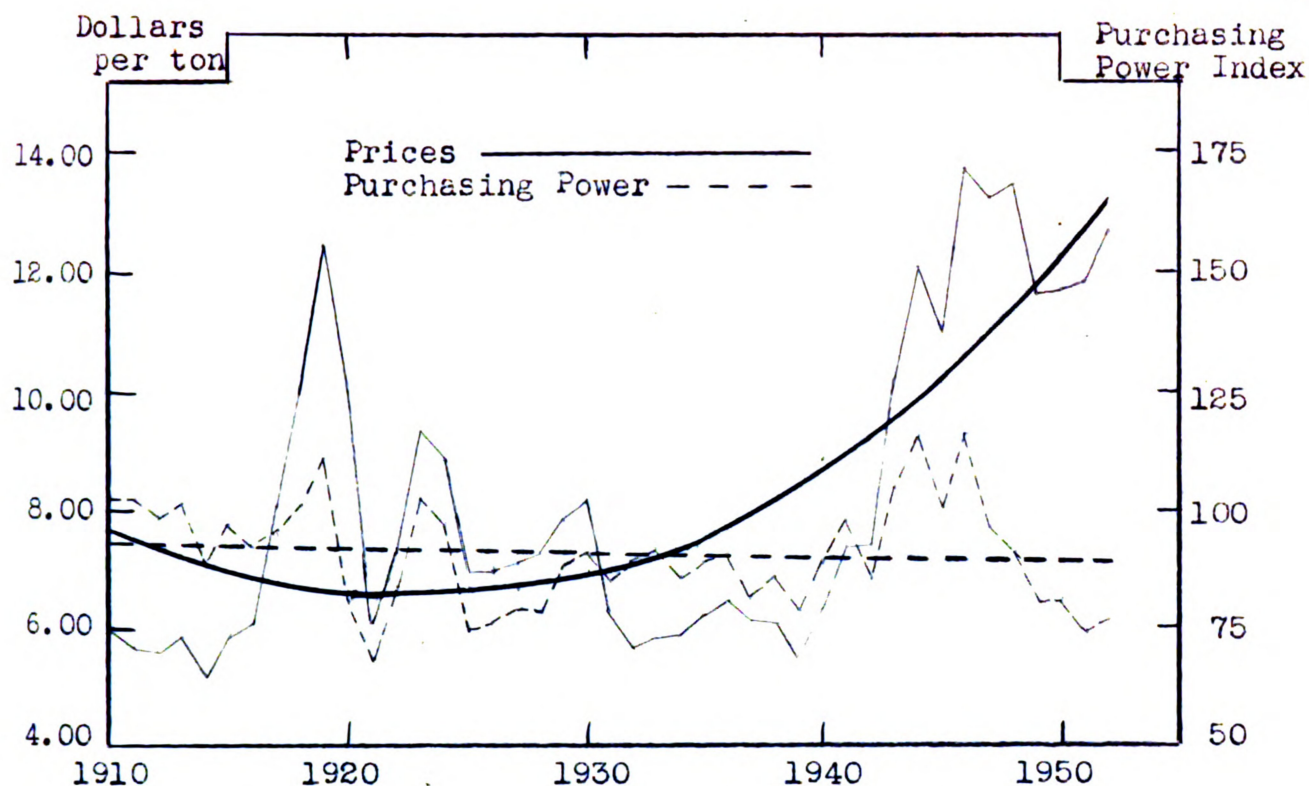
Figure 19.   SUGAR BEETS: Trends in Prices and Purchasing Power, 1910-1952.
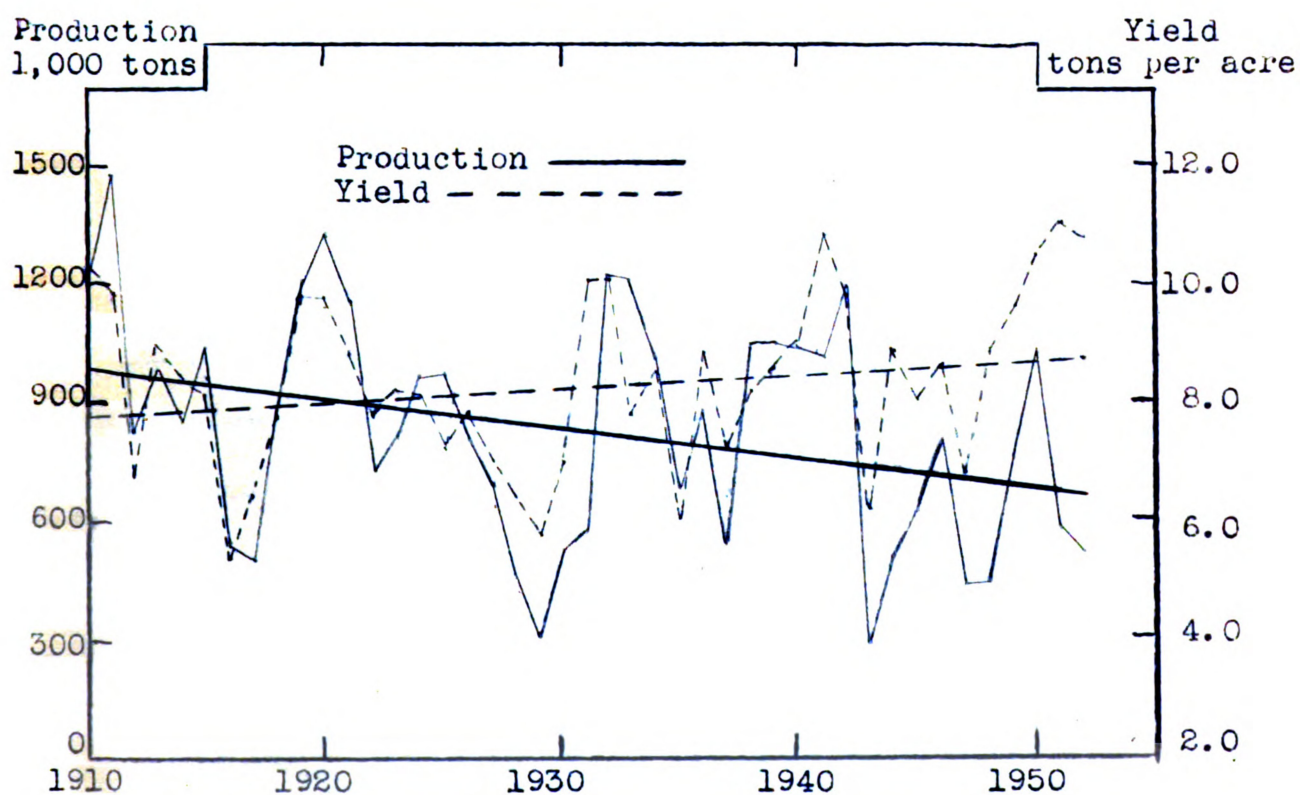
Figure 20.   SUGAR BEETS: Trends in Production and Yields, 1910-1952.

on the basis of sugar content of their product.[1] Consequently certain sugar mills have been paying producers higher prices for their sugar beets on the basis of this government subsidy. In this way the government program of limiting imports and subsidizing local producer markets has resulted in higher sugar beet prices to farmers.

The limited fluctuations in purchasing power indicates the great effect that business conditions have had on the price of sugar beets. Because sugar is an internationally traded commodity, prices are subject to fluctuations in business conditions, and these fluctuations are in turn reflected in movements of sugar beet prices. The slight downward trend of purchasing power appears to have been a result of changing economic conditions that raised prices of things farmers generally buy more than sugar prices.

In summary, the more important factors influencing Michigan sugar beet prices have been foreign supplies and foreign prices, government quotas on imports, Government subsidy payments, and the rise in the general price level since 1940.

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[1]Production and Marketing Association, Price Programs of the United States Department of Agriculture, United States Department of Agriculture, Washington, D. C., Misc. Publication 683, 1948.

Production. Although production of sugar beets by
Michigan farmers has fluctuated widely, a downward trend
has existed during the past 43 years (See Fig. 20). This
downward trend was caused partially by three periods of
abnormally low production -- 1916-1917, 1929, and 1943.

These wide fluctuations in production were closely
associated with corresponding fluctuations in yield and
acres harvested. The abnormal increase in production
during the depression was a result of a high purchasing
power of sugar beets which caused farmers to expand their
acreages considerably.

The general downward price trend since 1910 appears to
have been a result of the fact that Michigan farmers found
the production of other crops more profitable. This was
due largely to high costs of production brought about by
the amount of labor required to produce sugar beets. This
downward trend in production would have been more pronounced
if it were not for the subsidies paid to producers by the
government. These subsidies along with import tariffs
made beet farming a more attractive farming enterprise
in Michigan and in United States than it otherwise would
have been.[1]

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[1]Witt, L. W. Recent Developments in United States Sugar
Policies. Michigan Quarterly Bulletin. Vol. 31, No. 2,
1948, pp. 204-214.

<u>Yield</u>. Sugar beet yields varied widely from year
to year due to changes in growing conditions. However
the slowly increasing average yield since 1910 probably
was due to increased fertilizer applications and the use
of improved cultural practices (See Fig. 20).

Pears

Prices and Purchasing Power. The strong upward trend
in prices of Michigan pears was largely a result of unusually
high prices from 1943 to 1948 (See Fig. 21). Fluctuations
of price and the trend of prices since 1934 were associated
closely with the production of pears in United States, and
to a lesser extent, in Michigan.

The downward trend in pear prices from 1910 to 1922
was a result of the lower price levels following World War
I. The low pear prices from 1932 to 1942 were largely
explained by corresponding years of high production which
increased supplies considerably. The price probably would
have been much lower had it not been for the greater demands
during this period due to the rapidly increasing personal
incomes.

The recent upward trend in prices was influenced
primarily by the very high prices of 1943 to 1948. A
slightly reduced supply coupled with increased war demands
and the good business conditions of this period were
apparently the primary cause of the upward trend in prices
of Michigan pears.

The slight upward trend in purchasing power was
influenced greatly by very high prices from 1943 to 1948
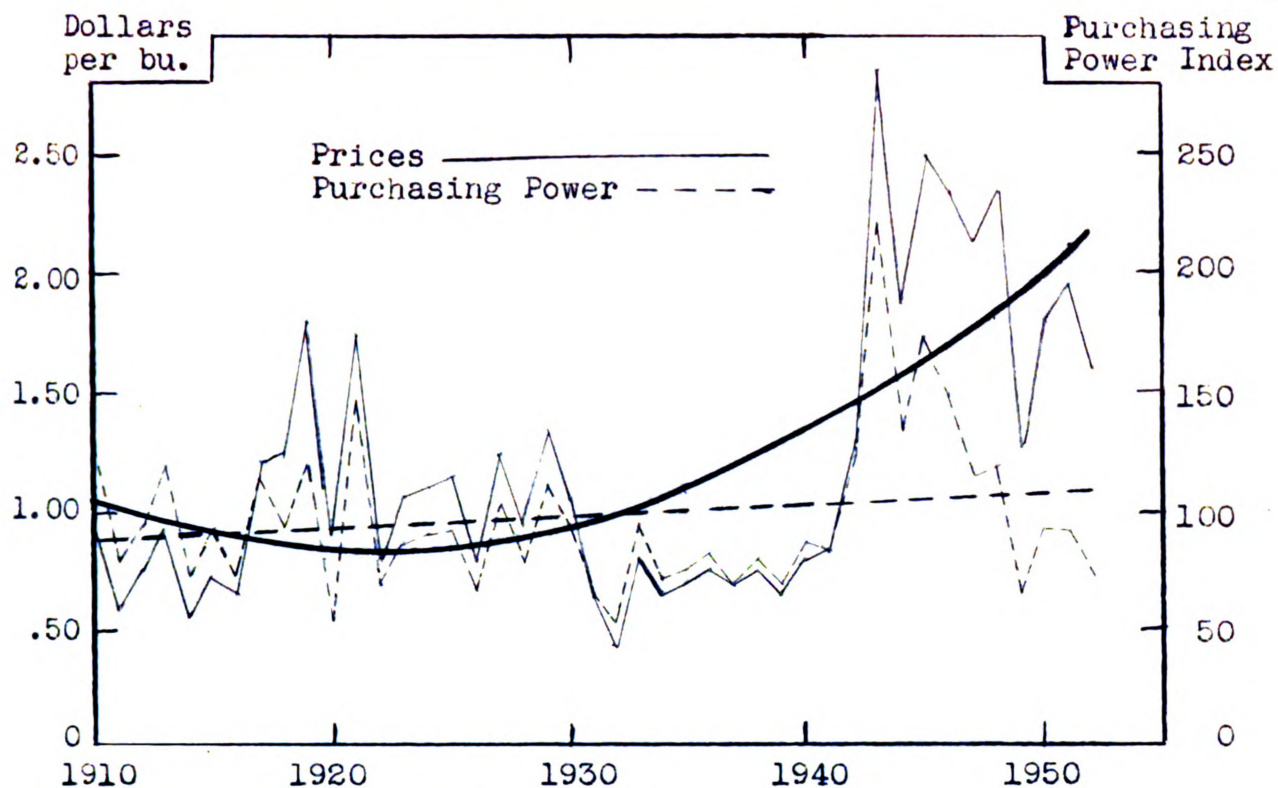
Figure 21.   PEARS: Trends in Prices and Purchasing Power, 1910-1952.
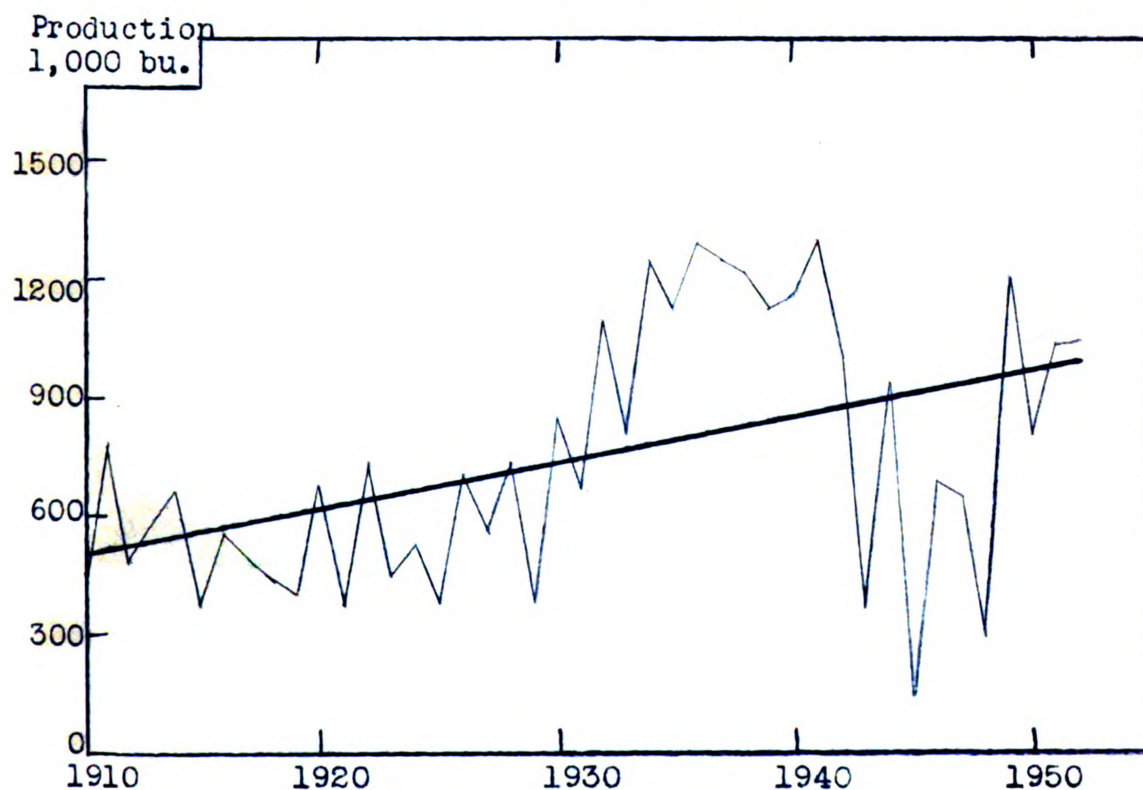
Figure 22.   PEARS: Trends in Production, 1910-1952.

caused primarily by an upward trend in the consumption of fresh fruits and a slightly reduced supply.

Production. The strong upward trend in production was due primarily to a period of unusually high production from 1930 to 1943 (See Fig. 22). This period of high production was associated with an increase in the number of pear trees and also with years of favorable weather conditions.

The drastic downward fluctuations in production were due almost entirely to low yields when weather conditions such as frost limited production in certain years.

In summary, the more important factors affecting production of pears have been changes in the number of pear trees and variations in climatic conditions.

Peaches

Prices and Purchasing Power. Although no significant
trend existed for peach prices, it was evident that year
to year fluctuations in prices were associated with corre-
sponding opposite fluctuations in production (See Fig. 23).
The changing nature of the weather seriously affected the
annual production of peaches and the quality of the peach
crop, which has in turn been reflected in annual price
movements.

The long downward trend in purchasing power of Michigan
peaches was largely a reflection of substantially increased
levels of production in recent years. This increased the
supply and as a result reduced the real price that fruit
growers obtained for their product. The changing economic
conditions also raised prices in general so that there has
been a decline in the purchasing power of peaches. The
very high purchasing power of the war years reflected the
increased demand and indicates a real price to farmers
that was higher than for most other farm products.

Production. Michigan peach production has been
characterized by a strong upward trend and by severe
annual fluctuations about this trend (See Fig. 24). These
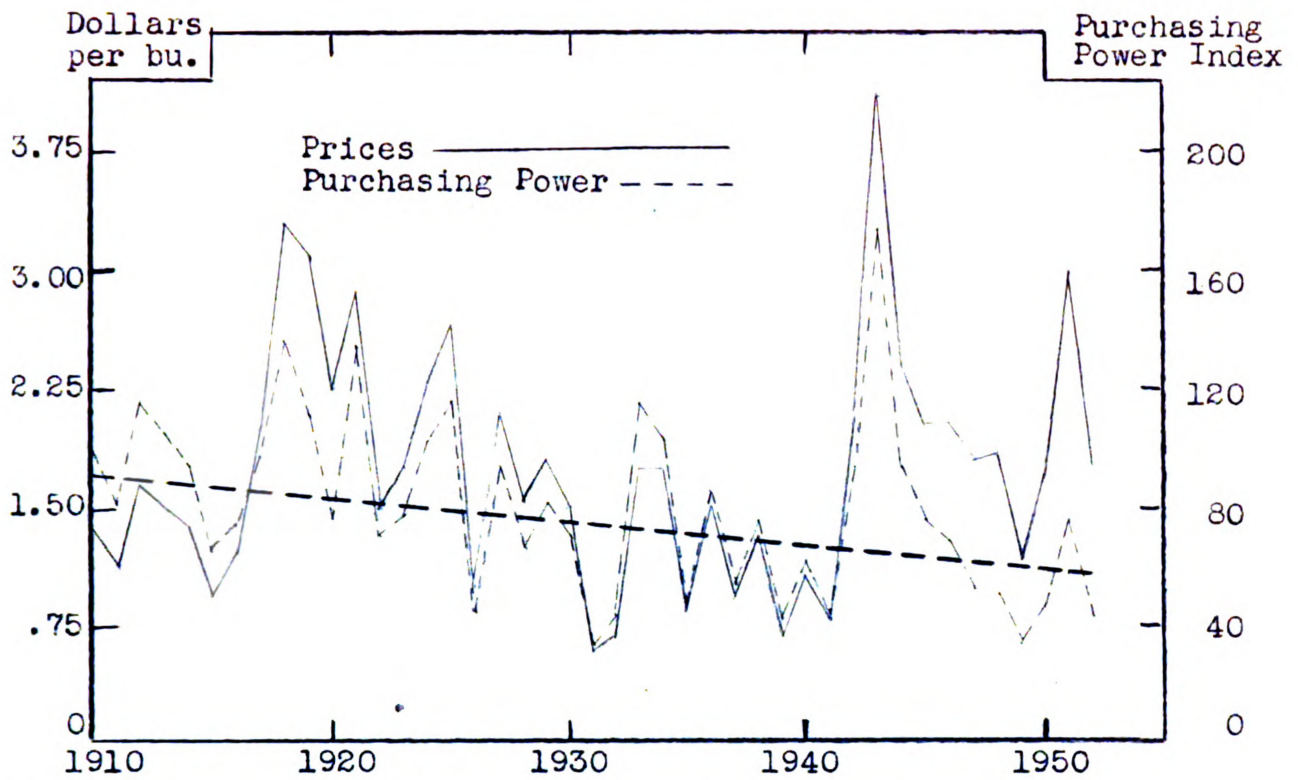
Figure 23.   PEACHES: Trends in Purchasing Power, 1910-1952.
(no significant trend exists for prices)
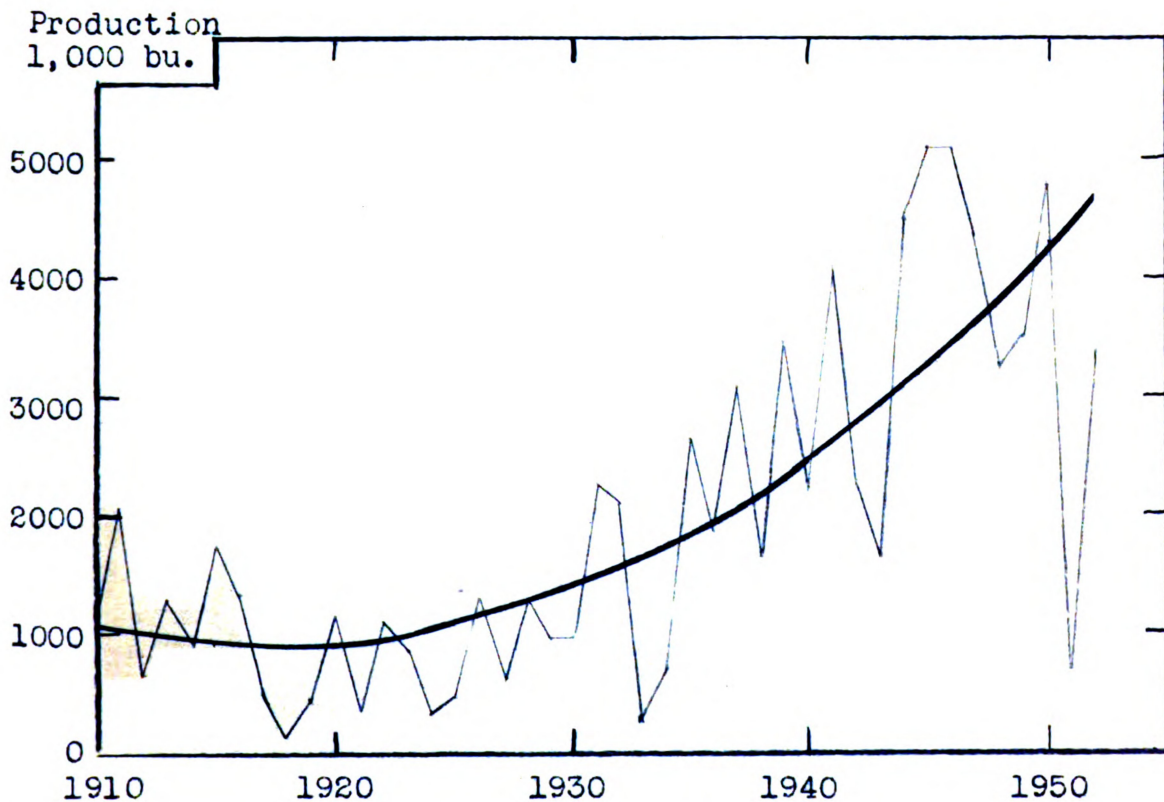
Figure 24.   PEACHES: Trends in Production, 1910-1952.

wide fluctuations were due primarily to annual variations
in weather, which seriously affected growing conditions
for peaches. The upward trend in production has been
closely associated with the increased number of fruit
bearing trees in Michigan. The generally higher prices
of peaches during recent years prompted many growers to
increase tree plantings. Other factors that have been of
importance in increasing production are the introduction
of new, higher yielding varieties, and the general improve-
ment of cultural practices.

Apples

Prices and Purchasing Power. Prices of apples grown
in Michigan experienced an upward trend which was influenced
primarily by high apple prices from 1943-1948 (See Fig. 25).
The upward movement of prices was largely a result of high
consumer purchasing power from 1943 to 1948, as compared
to the low consumer purchasing power during the depression.

The initial period of high apple prices from 1919 to
1929 was a result of the good business conditions during
World War I and the decreased production of apples during
the twenties. This was followed by a period of poor apple
crops in both the United States and in Michigan. The affect
of this reduced supply was to raise apple prices considerably
from 1919 to 1929.

Prices of Michigan apples rose to a peak of $3.38 per
bushel in 1945. This peak was accompanied by generally
high apple prices from 1943 to 1948 and an extremely short
crop in 1945. In general the more important factors
affecting Michigan apple prices have been the annual
production in the United States and Michigan, the quality
of the apple crops, and disposable consumer income.

The trend in purchasing power exhibited a gradual
increase caused almost entirely by very high prices from
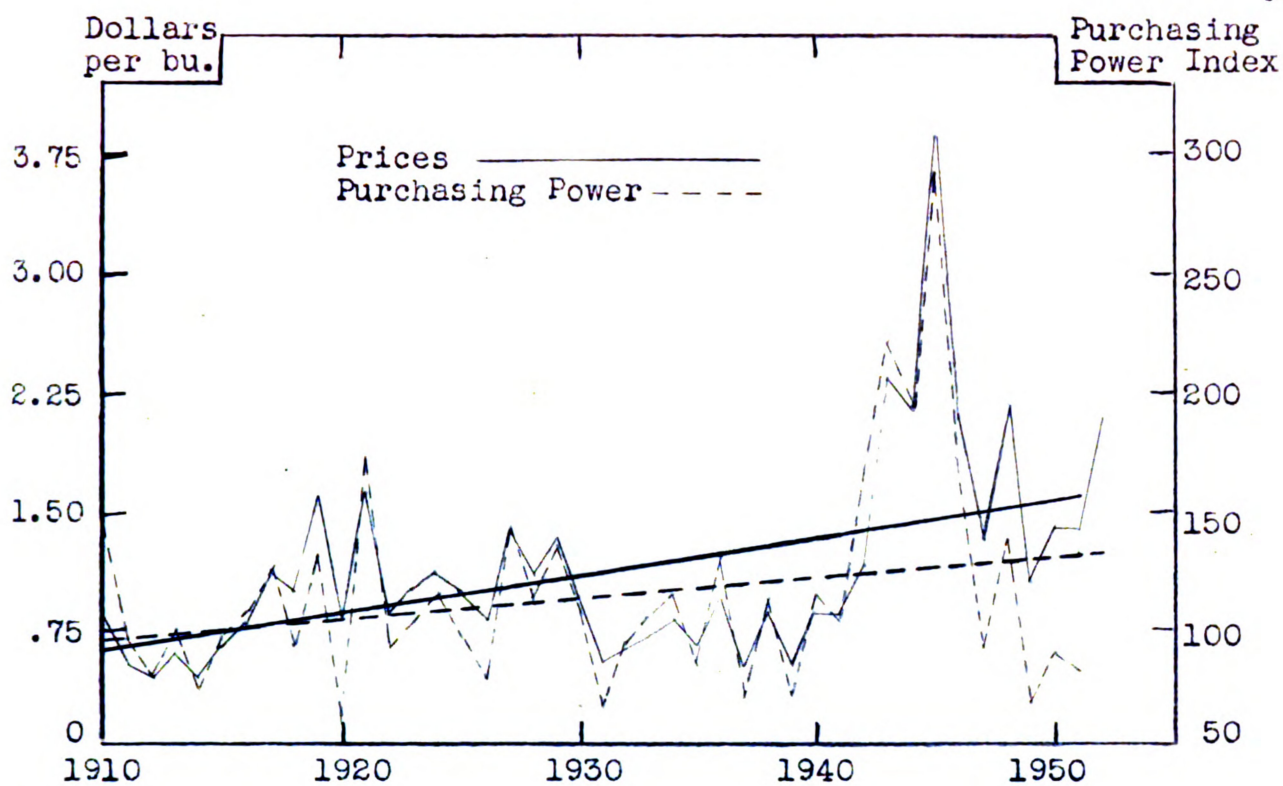
Figure 25. APPLES: Trends in Prices and Purchasing Power, 1910-1952.
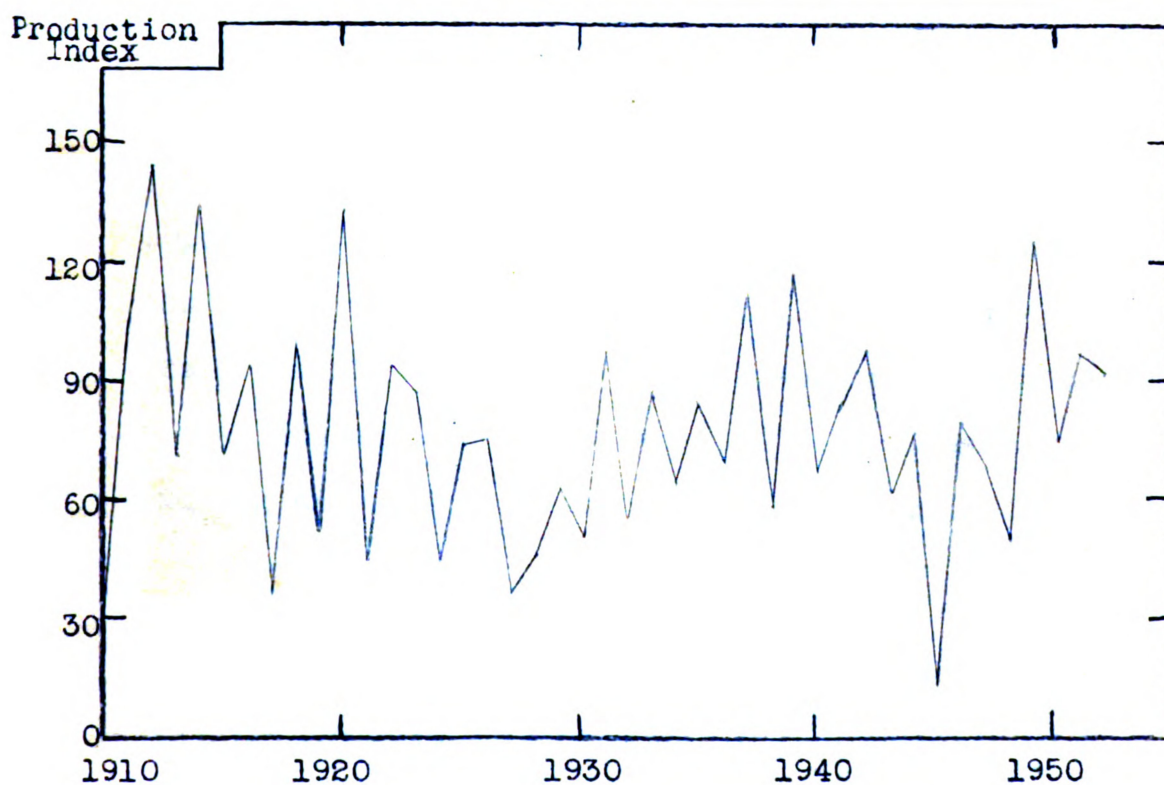
Figure 26. APPLES: Index of Production, 1910-1952.
(no significant trend)

1943 to 1946. Apparently the extreme downward fluctuations in production during this period in Michigan and in the United States reduced the supply of apples. This raised the real price of apples considerably and accounts in large part for the existing upward trend in purchasing power.

The fact that purchasing power of apples increased rather than decreased as have most other Michigan farm products is rather unusual when it is noted that changing business conditions raised prices of things that a fruit grower usually buy. This apparently was accounted for by the unusually high prices resulting from the shortage of supplies and the increased demand in the mid 'forties.

Production. No significant trend was found in the production of apples in Michigan due to the extremely wide fluctuations in production from year to year (See Fig. 26). Apparently annual variations in the weather altered growing conditions to such an extent that the production of apples was seriously affected. Such factors as frost and drought, along with disease and pests have been of importance in causing these wide fluctuations of production.

PART II

LIVESTOCK AND LIVESTOCK PRODUCTS

All Cattle

Trends and Cycles in Number on Farms. The number of
all livestock on farms is ultimately limited by the amount
of feed which can be produced locally and by the cost of
bringing feed and livestock into Michigan from other states.
Closely associated with changes in the cost of feed, and
therefore with the number of cattle on farms, is the price,
production, and total revenue derived from the production
of many food crops such as wheat, rye, sugar beets, field
beans, and potatoes.

Although the trend in numbers of cattle on farms has
been moving upward since 1913, it is only since 1935 that
there has been any substantial increase in cattle numbers
(See Fig. 27). The increase in the price of cattle since
1936, which has been due to heavy demands for meat during
World War II, made cattle raising a very profitable enter-
prise. This apparently was important in causing farmers
to increase their cattle numbers.

In general, it appears that the higher cattle prices
accounted for the greater number of cattle on Michigan
farms.

No. of cattle
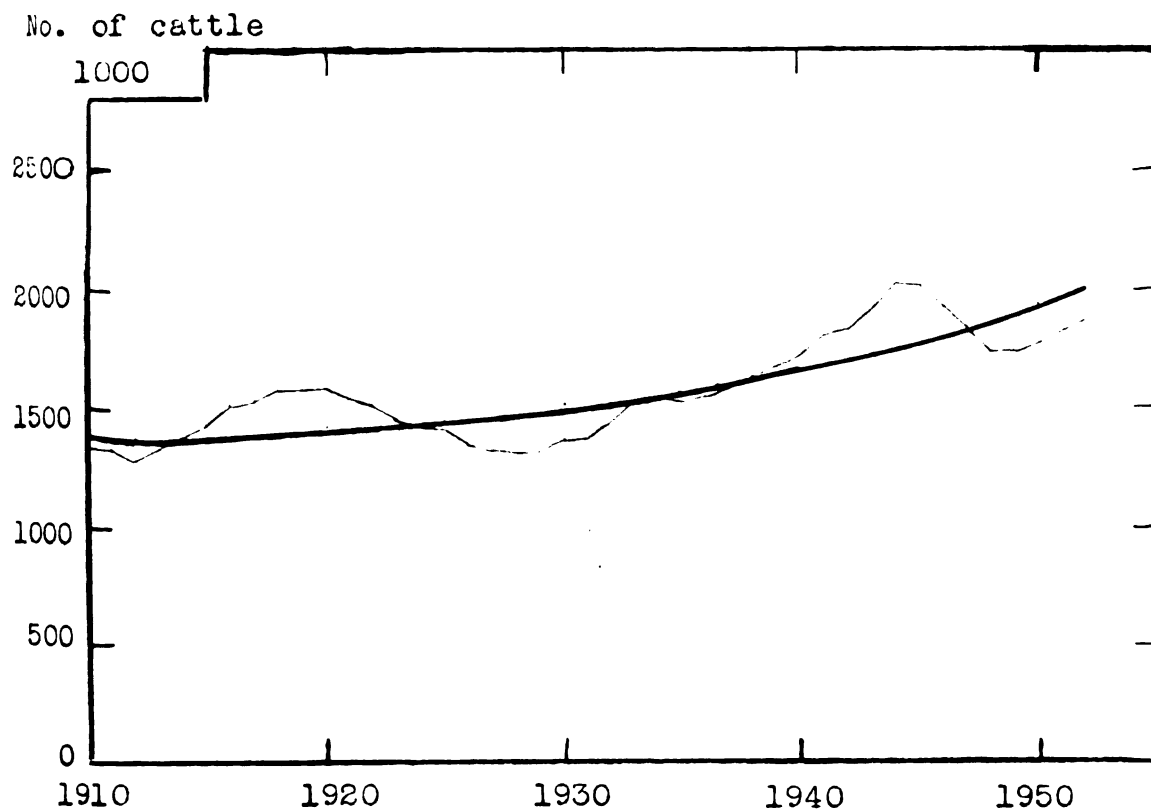
Figure 27. ALL CATTLE: Trends in Numbers on Farms,
1910-1952.
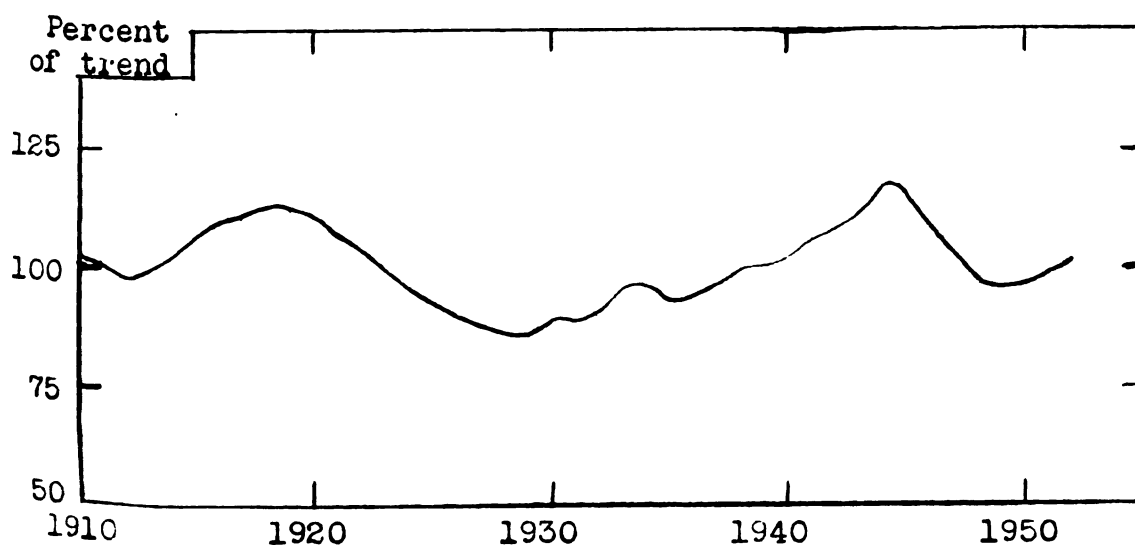
Figure 27a. ALL CATTLE: Cycles in Numbers on Farms,
1910-1952.

The number of livestock on farms in Michigan appears to have followed a cycle approximating 10 to 15 years in length during the period 1910 to 1952 (See Fig. 27a). The major peaks that were reached in 1919 and 1944 were reflections of the greater demand and the generally good business conditions of the past two world wars, in higher prices for cattle. The minor peak in numbers on farms that is noticeable in 1934 may have been due to a tendency on the part of some farmers to increase their cattle numbers so as to maintain their level of income during this period of low prices.

The length of the cattle cycle in Michigan was shorter than the 15 year average cycle in cattle numbers for United States as a whole.[1] Also the amplitude of these cycles have not had the same consistency that was evident in cycles of all cattle in United States.

On observation of these cycles of cattle numbers, there may be some doubt as to whether these are true cycles as defined earlier. A true cycle in numbers of cattle is regularly recurring and self-generating. When cattle prices were declining, producers began to liquidate their herds. As this decline continued, the breeding

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[1]Thomsen and Foote, op. cit., Fig. 70, pp. 388.

stock composed of cows and heifers, were finally reduced
to the point that there was a shortage of slaughter
receipts. Consequently prices rose again and producers
began to build up their herds to take advantage of these
higher prices. In building up their herds livestock
growers forced prices up still higher until the point
was reached where they began to market these large herds.
The sudden influx of slaughter receipts forced the price
down again and the cycle was repeated. In Michigan it
appears that external factors such as the abnormal demands
of two world wars have been more important in causing
cycles of production of cattle. For this reason it may
be quite justifiable to conclude that these movements
in numbers were not true cycles.

Beef Cattle

Trends and Cycles in Prices. The initial downward trend in prices of Michigan beef cattle from 1910 to 1924 appears to have been closely associated with changes in business conditions (See Fig. 28). The low beef prices during the depression, which were a reflection largely of the low consumer purchasing power and an increase in slaughter receipts as farmers reduced their herds, has apparently been of importance in causing this initial downward trend.

The very strong rise in the prices trend since 1924 was due to unusually high beef prices since 1941, which was a reflection primarily of an increased demand. The increased demand arose from the relatively high purchasing power of consumers during these years. This caused a substantial increase in the demand for meat.

The purchasing power trend has followed closely the trend in prices of beef cattle. The initial decline in purchasing power from 1910 to 1926 was apparently a result of increased cattle numbers during this period. The strong rise in purchasing power was apparently a result of decreased cattle numbers since 1944 and a substantial increase in the purchasing power of consumers.
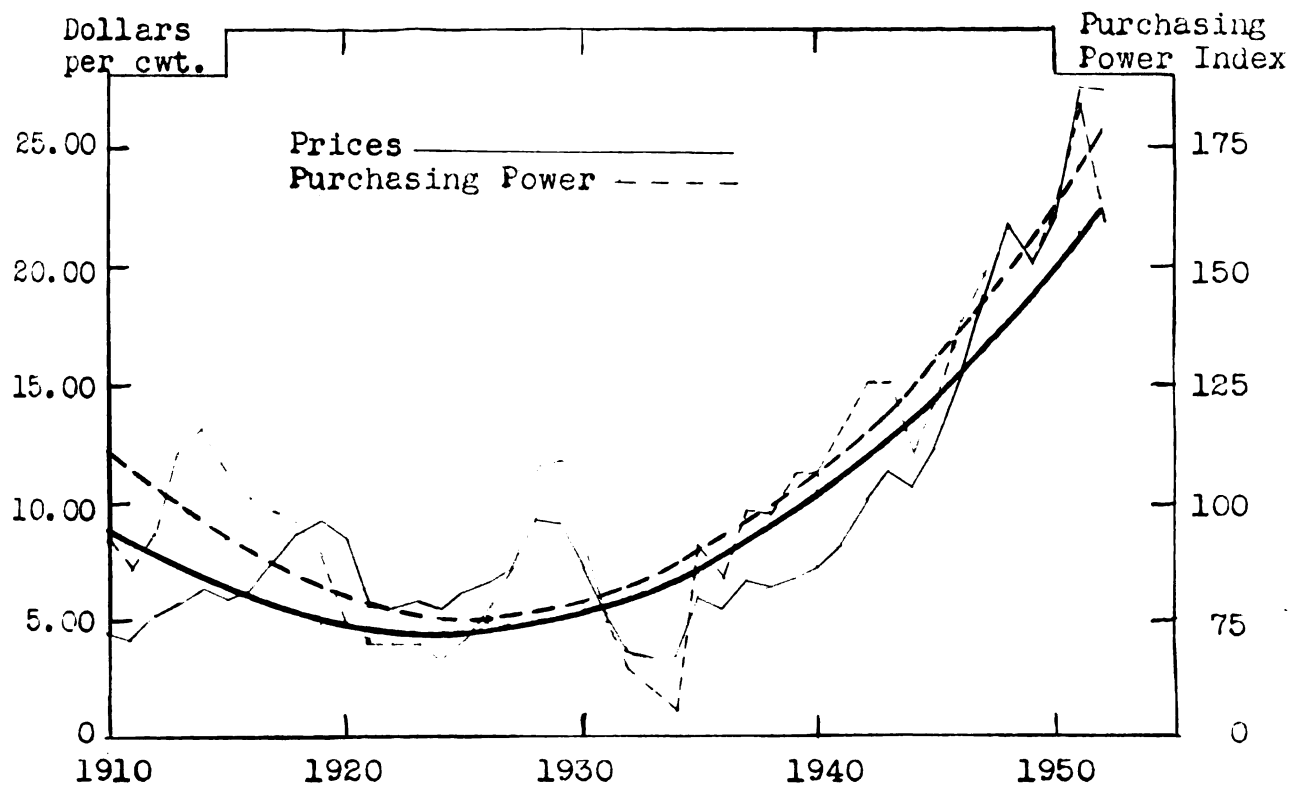
Figure 28. BEEF CATTLE: Trends in Prices and Purchasing Power, 1910-1952.
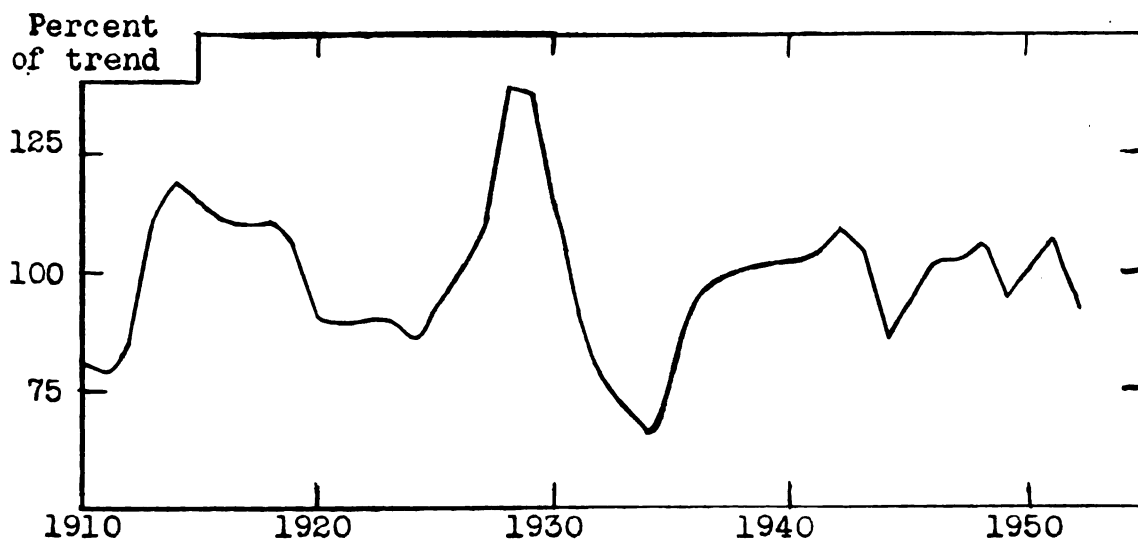
Figure 28a. BEEF CATTLE: Cycles in Purchasing Power, 1910-1952.

It is evident that beef prices have been influenced primarily by the changing general price level, the purchasing power of consumers and its effect on demand, along with changes in the numbers of cattle on farms.

Since 1910 cyclical peaks appear to have existed in 1914, 1929, 1942-43, and at the present time the peak of another cycle is approaching (See Fig. 28a). These cycles are due in large part to a distinct inverse relation between number of cattle on farms in United States and the price of cattle. This was modified to some extent during two wars when abnormal demands and the general business conditions took precedent over numbers of animals as a determining factor of beef price cycles. However under normal conditions when prices are high, the number of animals available is characteristically low. Livestock growers build up their herds by maintaining a greater number of breeding stock so as to take advantage of these higher prices. Eventually growers must market these increased numbers of cattle. At this time they find that the suddenly increased slaughter receipts have forced prices down with the breeding stock partially liquidated, short slaughter receipts follow which result in a period of high prices. This cycle, due to the inter-relation of price and farm production, continues as a self-generating, regularly recurring movement.

Veal Calves

Trends and Cycles in Prices. The trend of veal calf prices was primarily dependent upon beef cattle prices. Consequently price trends of these two products have been very similar. As with beef prices, veal prices declined from 1910 to 1924, remained at a low level throughout the depression, and rose rapidly in recent years.

The initial downward trend from 1910 to 1924 and the extended period of low veal prices during the depression was associated with the low disposable consumer income of that time, which caused a reduction in demand for these expensive cuts of meat (See Fig. 29). Apparently this reduced demand has been important in causing the initial downward trend.

The strong price rise in recent years was influenced by very high veal prices since 1946. These high veal prices apparently were a result of the increased consumer purchasing power, which has raised the demand for these choice cuts of meat.

The trend in purchasing power followed, though to a lesser extent, the trend in veal prices (See Fig. 29). Probably the most important factor influencing the purchasing

Figure 29.   VEAL CALVES: Trends in Prices and Purchasing Power, 1910-1952.
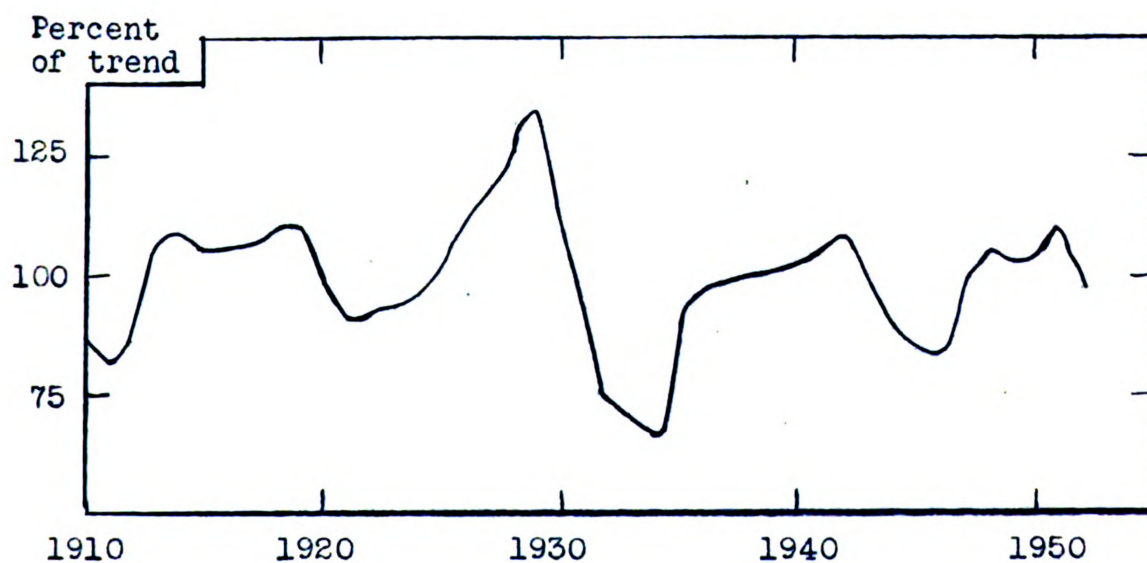
Figure 29a.   VEAL CALVES: Cycles in Purchasing Power, 1910-1952.

power trend has been disposable consumer income. Demand
for veal varies considerably with this factor. Consequently,
the low disposable income of consumers during the depression
caused the initial decline in purchasing power while the
greater disposable consumer income in the forties caused
an increase in the purchasing power of veal calves.

In summary, prices of veal calves in Michigan were
influenced primarily by consumer purchasing power, and to
a lesser extent by the price of beef and the number of
cattle on farms.

Because of the dependence of the price of veal calves
on the price of beef cattle, cycles in prices of veal closely
resembled those of beef cattle; averaging approximately
12-14 years in length. The peaks of these cycles occurred
in 1916, 1929, 1942, and apparently the peak of a fourth
cycle is now approaching (See Fig. 29a).

Following the high veal prices of World War I a period
of low veal prices from 1921 to 1925 appears to have been
a result of low beef prices and also increased marketings
of calves caused by the reduction of cattle numbers during
this period. The higher prices from 1925 to 1929 reflect
higher beef prices and reduced marketings of calves as
livestock growers were building up their herds in response
to higher prices.

Following the low prices of the depression, the high prices of veal calves from 1936 to 1942 were again a result of reduced marketings of calves as herds were built up as all prices rose. The decline in the price cycle from 1942 to 1946 was associated with increased marketings of cattle as growers again reduced herd sizes.

It is evident that throughout the records cycles in prices of veal calves have averaged about 12-14 years in length, maintaining a close association with cycles in beef prices and an inverse relation with numbers of calves going to market. This was a reflection primarily of cycles in the total number of cattle on farms.

Hogs

Trends and Cycles in Hog Prices. Although the initial downward trend in hog prices appears to be from 1910 to 1925, low prices persisted until 1940 (See Fig. 30). It is the relatively high prices since 1940 that accounts for the strong upward trend in hog prices that has existed in recent years.

The initial downward trend from 1910 to 1925 and the generally low prices in subsequent years apparently were a result of a number of factors. The poor business conditions and the low level of consumer purchasing power during the depression has had considerable influence in causing low hog prices. Secondly, the export market was weakened by the low purchasing power of importers and by the increased competition in the international market from Canada, Denmark and the Netherlands. It has probably been a combination of these factors rather than any single one that accounted for this early downward trend.

The strong upward movement in prices of hogs in recent years reflected the good business conditions and the higher consumer purchasing power of World War II. At the same time a rapidly increasing population and the very high prices of beef led to a greatly increased demand
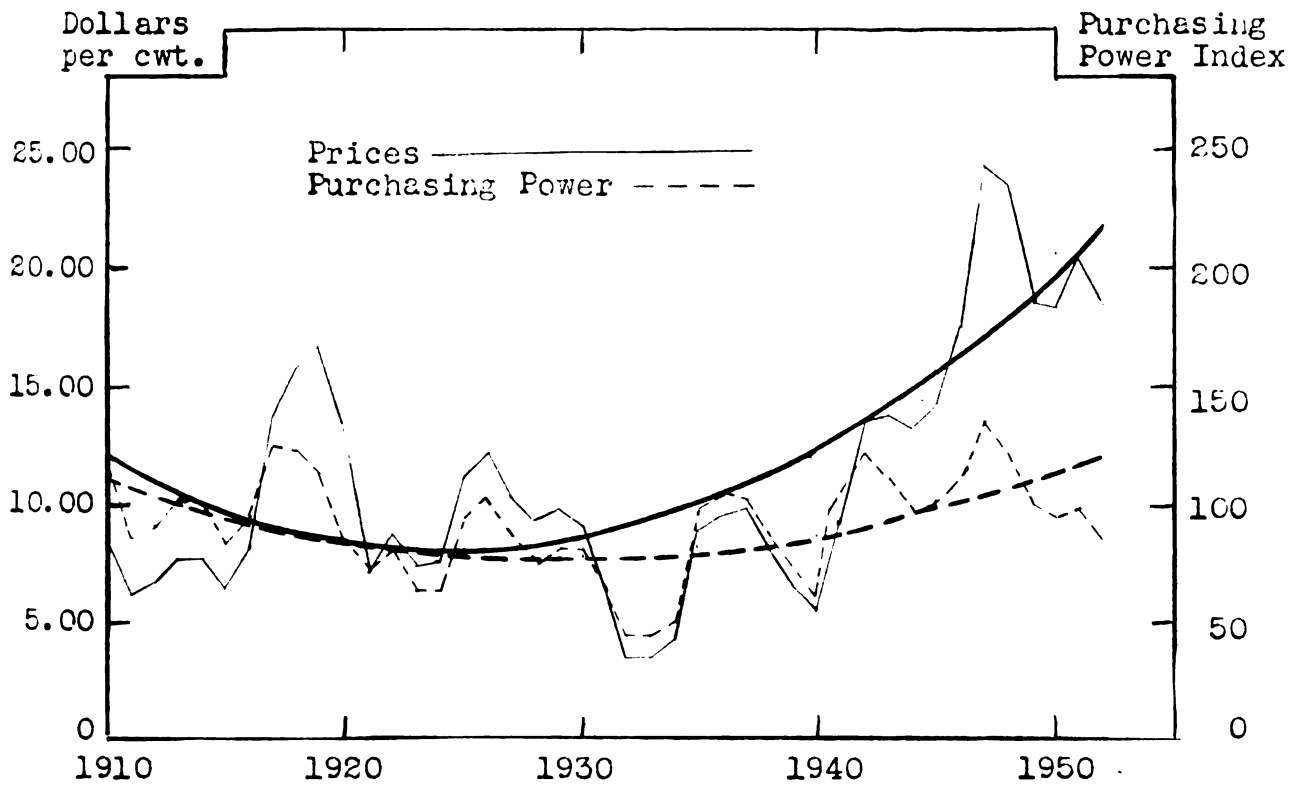
Figure 30.   HOGS: Trends in Prices and Purchasing Power,
1910-1952.
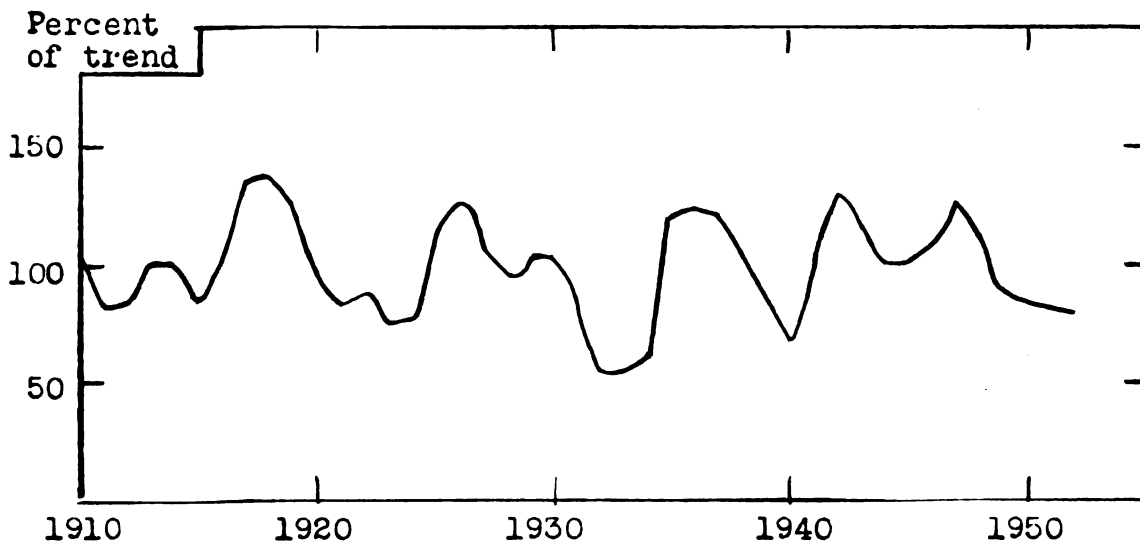
Figure 30a.   HOGS: Cycles in Purchasing Power, 1910-1952.

for pork which was again reflected in the rising price of hogs.

The purchasing power trend of hogs declined rapidly from 1910 to 1934 reflecting in large part the low purchasing power of consumers during the depression years (See Fig. 30a). A second factor of importance may have been the large number of hogs on farms from 1910 to 1924, which when marketed reduced the real price of hogs. The strong rise in the purchasing power of hogs in recent years apparently was a result of greatly increased demands for pork since 1940 due to both the higher disposable consumer income and the increasing population.

In summary, the more important factors affecting the trend in hog prices were general business conditions, United States supply of hogs, the cost of feed, the change in foreign demand, the increase in population, and the price of substitute meats.

Cycles in hog prices in Michigan varied in length from 4-6 years and averaged approximately 5 years (See Fig. 30a). These cycles have been fairly consistent in both amplitude and length, resembling hog price cycles for all United States.

Cycles in hog prices appear to have been influenced largely by the cyclical movement of numbers of hogs on

farms, which in turn was partly a result of the hog-corn ratio which also moved in cycles.[1] The cycles in hog numbers on farms caused alternating periods of high slaughter receipts and low slaughter receipts. Consequently prices of pork have moved in fairly regular cycles, inversely related to cycles in hog marketings.

Trends and Cycles in Hog Numbers. The long downward trend in numbers of hogs on farms from 1910 to 1939 was largely a reflection of the relatively lower hog-corn ratios from 1926 to 1936. This made it more profitable to sell corn directly rather than to convert it into hogs. Similarly, the upward movement in hog numbers since 1936 has been associated with a corresponding period of greater-than-average hog-corn ratios. The rising hog prices of recent years caused farmers to grow more corn and to increase their production of hogs.

The cycles in hog numbers were primarily caused by fluctuations in the hog-corn ratio.[2] Following periods of high hog-corn ratios, numbers of hogs on farms increased in about 2 to 3 years, and following periods of low hog-corn ratios numbers of hogs on farms decreased in approximately

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[1]Thomsen and Foote, op. cit., Fig. 62, p. 372.

[2]Ibid.

No. of hogs
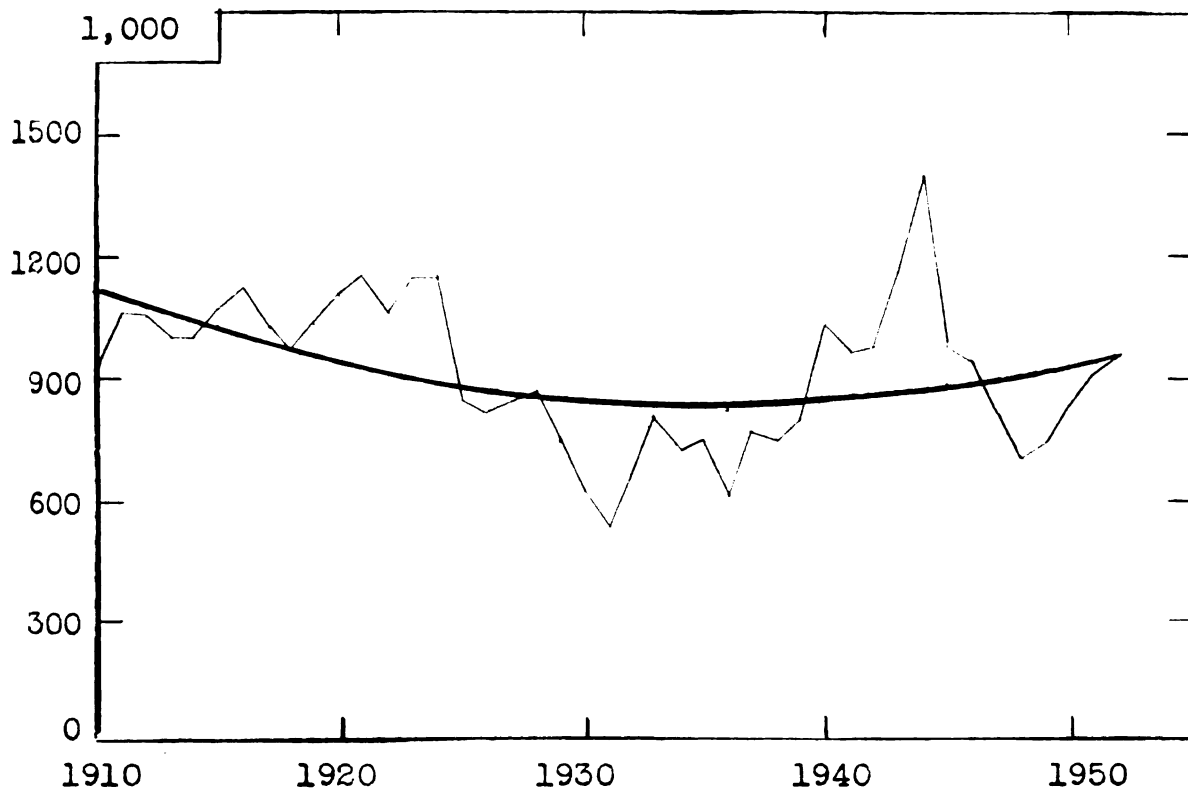
Figure 31. HOGS: Trends in Numbers on Farms, 1910-1952.
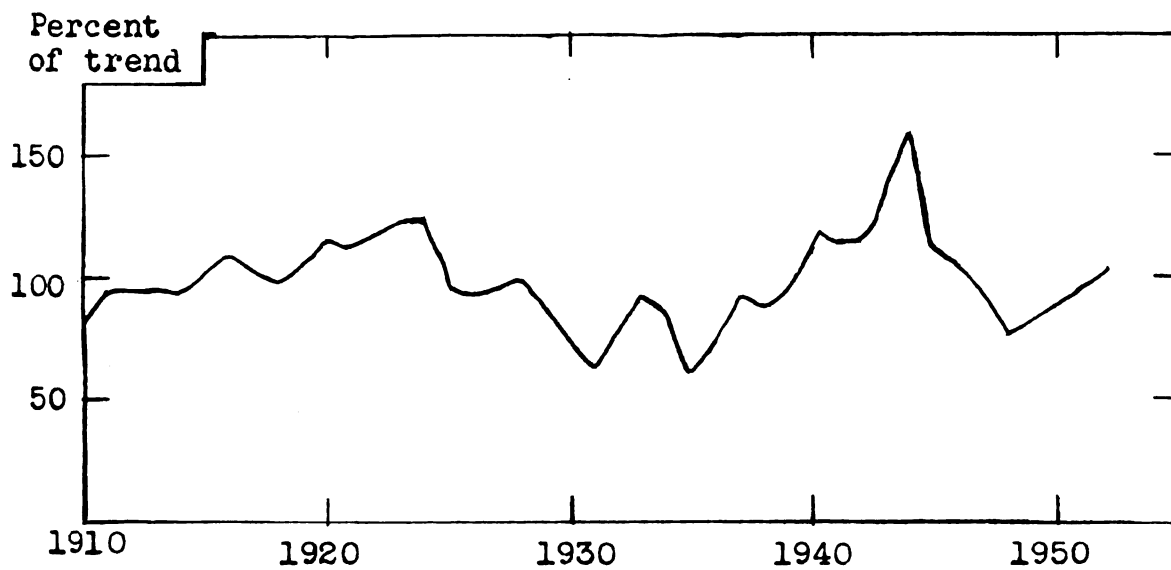
Figure 31a. HOGS: Cycles in Numbers on Farms, 1910-1952.

2 to 3 years. These decreased hog numbers caused an increase in hog prices relative to corn prices, which was then followed by a period of increasing hog numbers to take advantage of these higher prices. The cycles are not always of the same duration and intensity due to the influence of wars and depressions. Changes in yields, production, and prices of corn result in irregular changes in the hog-corn ratio, and also the varying response of growers to the hog-corn ratio have caused deviations from the normal occurrence of the cycle.

Stock Sheep

Trends and Cycles in Numbers on Farms. A distinct
downward trend in the number of sheep on Michigan farms
since 1910 is evident (See Fig. 32). Since sheep and
cattle compete for range, pasture, and other feeds, the
strong upward trend in cattle numbers on farms was
accompanied by this long-time decrease in the number of
sheep (Fig. 27). Fluctuations in sheep numbers were
inversely related to fluctuations in cattle numbers,
giving further indication of the inverse relation which
existed between the production of cattle and sheep. In
recent years the increased consumer purchasing power
raised the demand for beef relative to lamb. The resulting
increase in beef cattle production has been at the expense
of sheep production. At the same time alternative farming
opportunities have been more profitable in Michigan in
recent years, resulting in a tendency on the part of farmers
to get out of sheep production and into other farming
enterprises.

Cycles in numbers of sheep on Michigan farms do not
exhibit the same characteristic 7 to 12 year cycles that
are evident in numbers of sheep on United States farms
(See Fig. 32a). In Michigan, the three peaks in numbers

No. of Stock Sheep
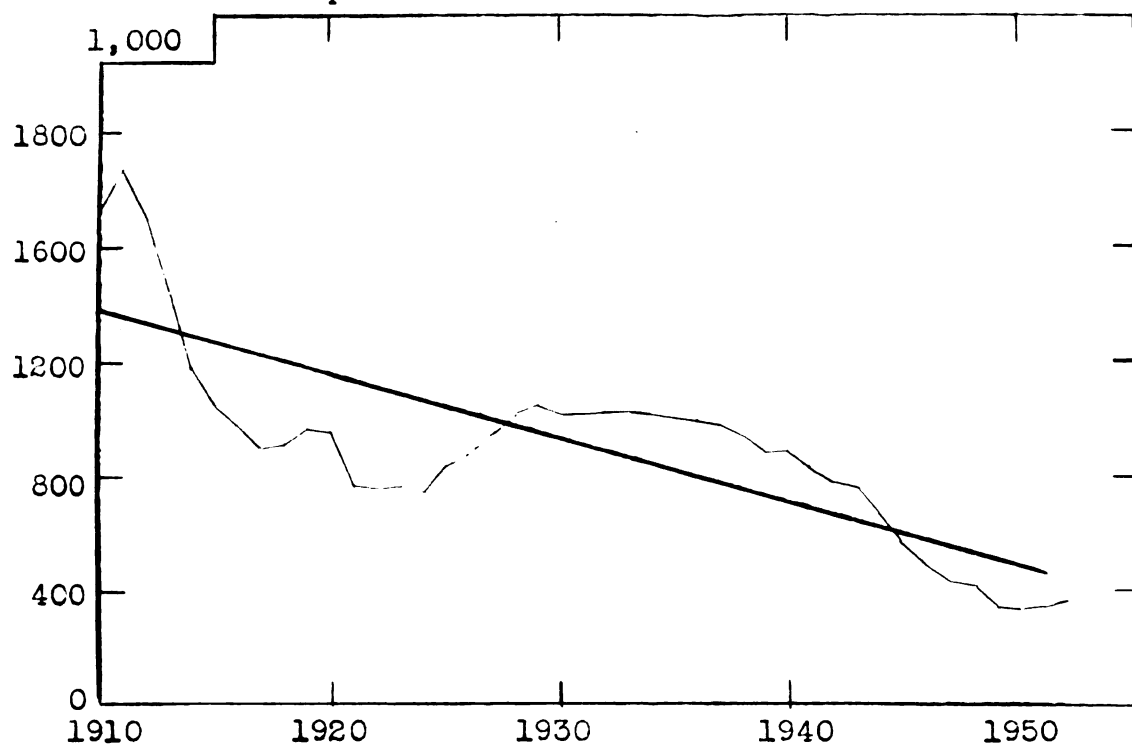
Figure 32.   STOCK SHEEP: Trends in Numbers of Stock Sheep
             on Farms, 1910-1952.
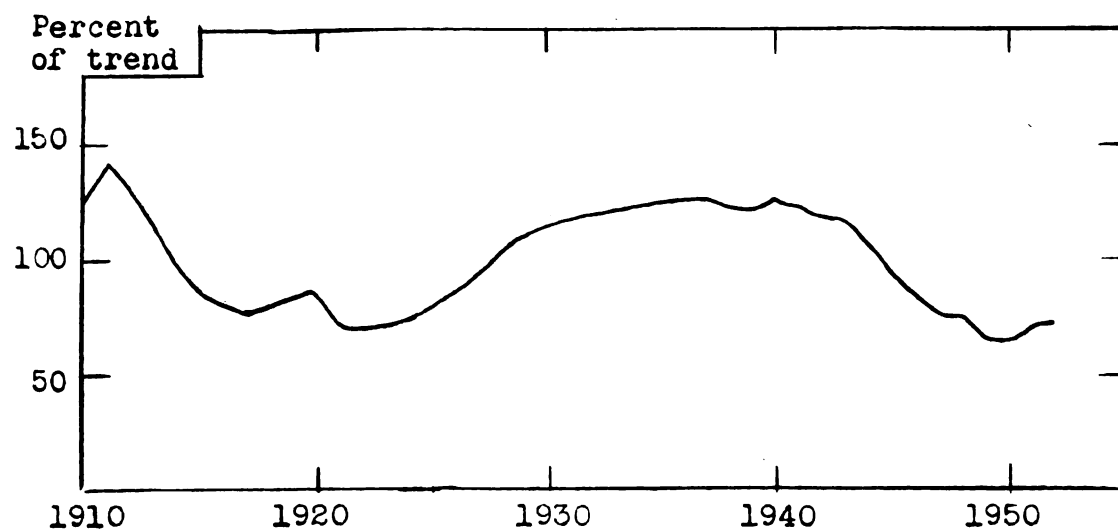
Figure 32a.   STOCK SHEEP: Cycles in Numbers of Stock Sheep
              on Farms, 1910-1952.

of sheep on farms were 9 to 17 years apart, occurring in
1910, 1920 and in 1937. Again this sheep cycle was closely
associated with cycles in numbers of cattle on Michigan
farms.[1]

A second factor that may account for these apparent
cycles was the variations in consumer demand. Consumption
of lamb and mutton is more or less confined to white collar
workers in certain regions on the Atlantic coast and
Pacific coast. The high income of these white collar
workers in the depression gave this class of consumers
a relatively high purchasing power during this period as
compared with industrial laborers. This increased the
demand for lamb and consequently the numbers of stock
sheep on all farms in United States. Similarly during
World War II, the purchasing power of this class of people
declined considerably relative to that of industrial laborers
and, as a result the demand for lamb and mutton decreased.
This reduced demand has been reflected in lower sheep numbers
on farms in recent years.

In summary, the more significant factors that have
influenced sheep numbers were cycles and trends of cattle
numbers on Michigan farms, variations in consumer demand,
and the changing number of stock sheep on United States farms.

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[1]The cycle in sheep numbers is not a true cycle that is
self-energized. Rather it appears to have been a result
of such external factors as cattle numbers and consumer
demand.

Sheep and Lambs

Trends and Cycles in Prices. Prices of sheep and lambs declined and remained low from 1910 to 1940, moving upwards since 1940 (See Figs. 33 and 34). These price trends were a result of very low sheep and lamb prices during the depression years which caused the initial downward trend, and very high sheep and lamb prices during World War II which caused the strong upward price trend of recent years.

The long-time trend of sheep and lamb prices was closely associated with the numbers of sheep on farms in Michigan and in United States as a whole.[1] The great increase in stock sheep numbers during the depression forced sheep and lamb prices down. This factor along with the generally low price level during the depression accounts for the initial downward trend in prices.

The sharply rising prices since 1945 were a result of declining sheep numbers extending from 1933 to 1949. This reduced supply with the accompanying increased consumer purchasing power of recent years have been major factors in accounting for the upturn in the trend of prices.

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[1]Thomsen, F. L. Agricultural Prices, ed. 1, McGraw-Hill, New York (1952), Fig. 79, p. 402.
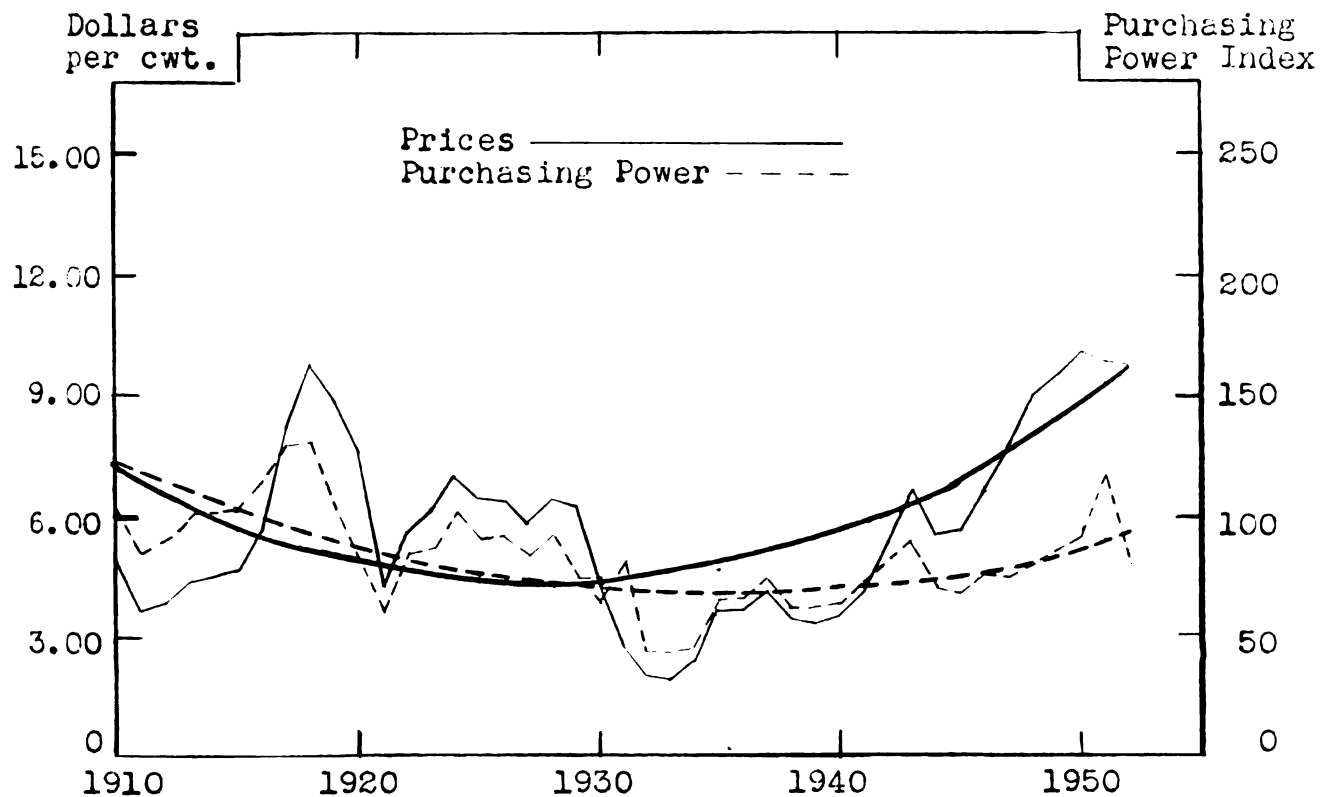
Figure 33.   SHEEP: Trends in Prices and Purchasing Power,
1910-1952.
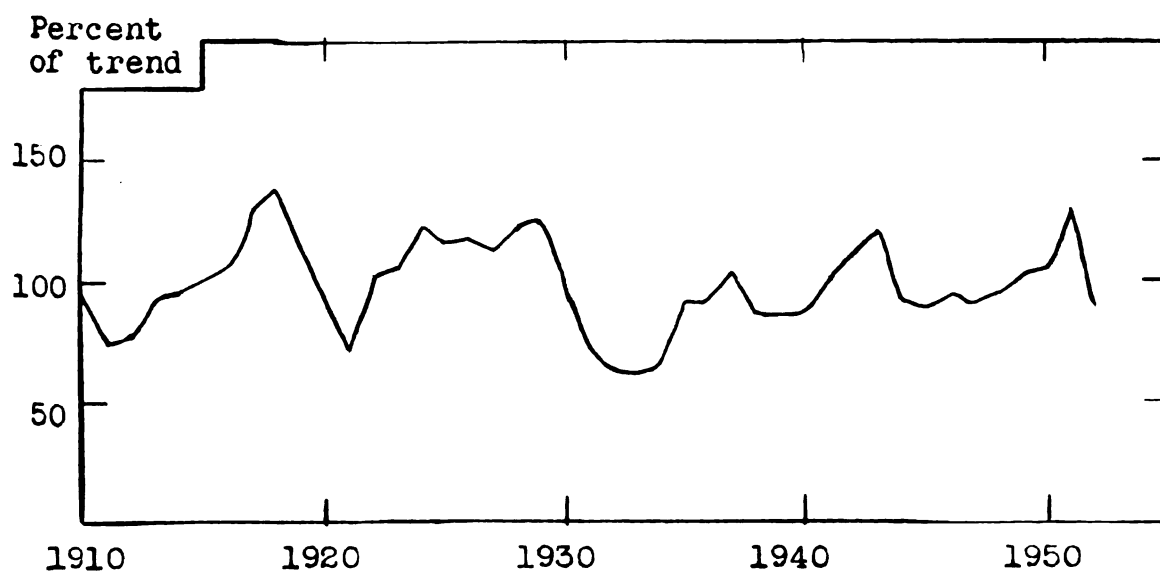
Figure 33a.   SHEEP: Cycles in Purchasing Power,
1910-1952.
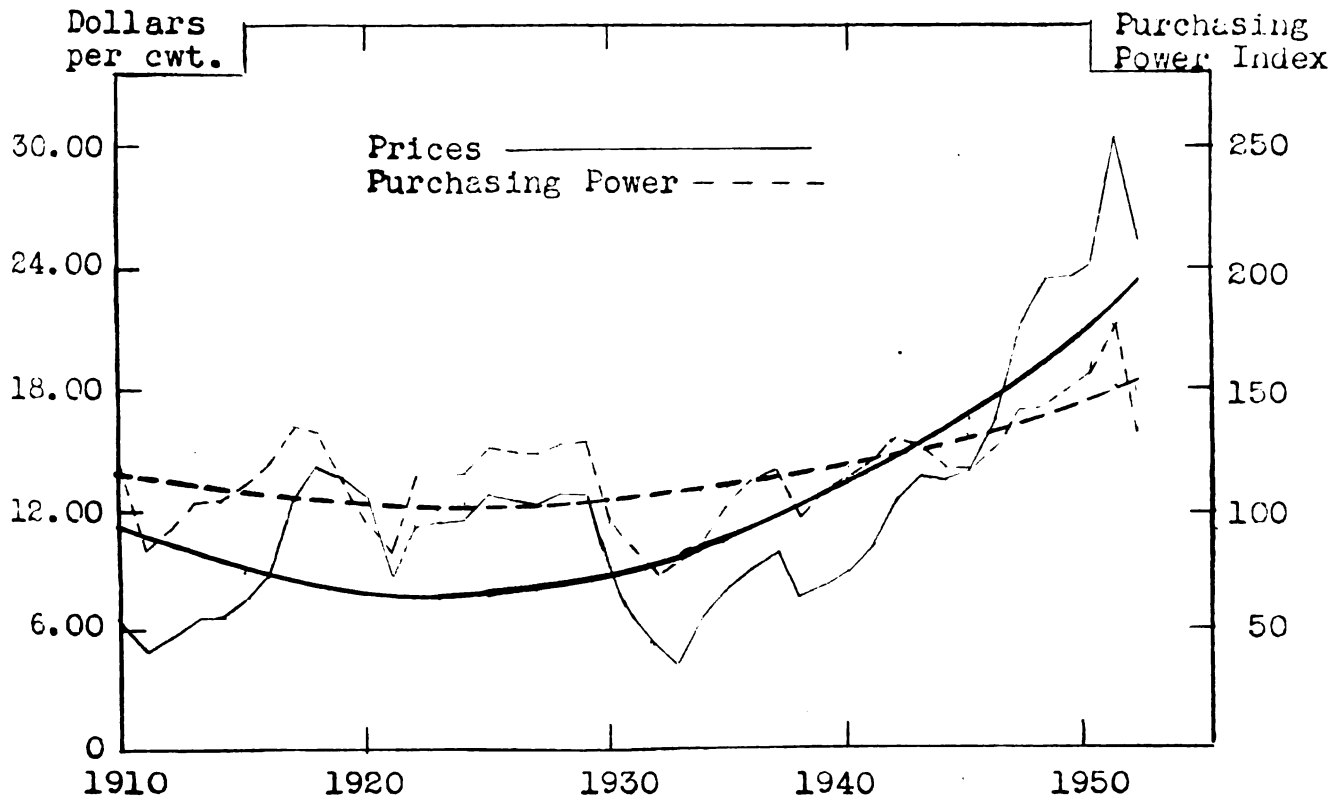
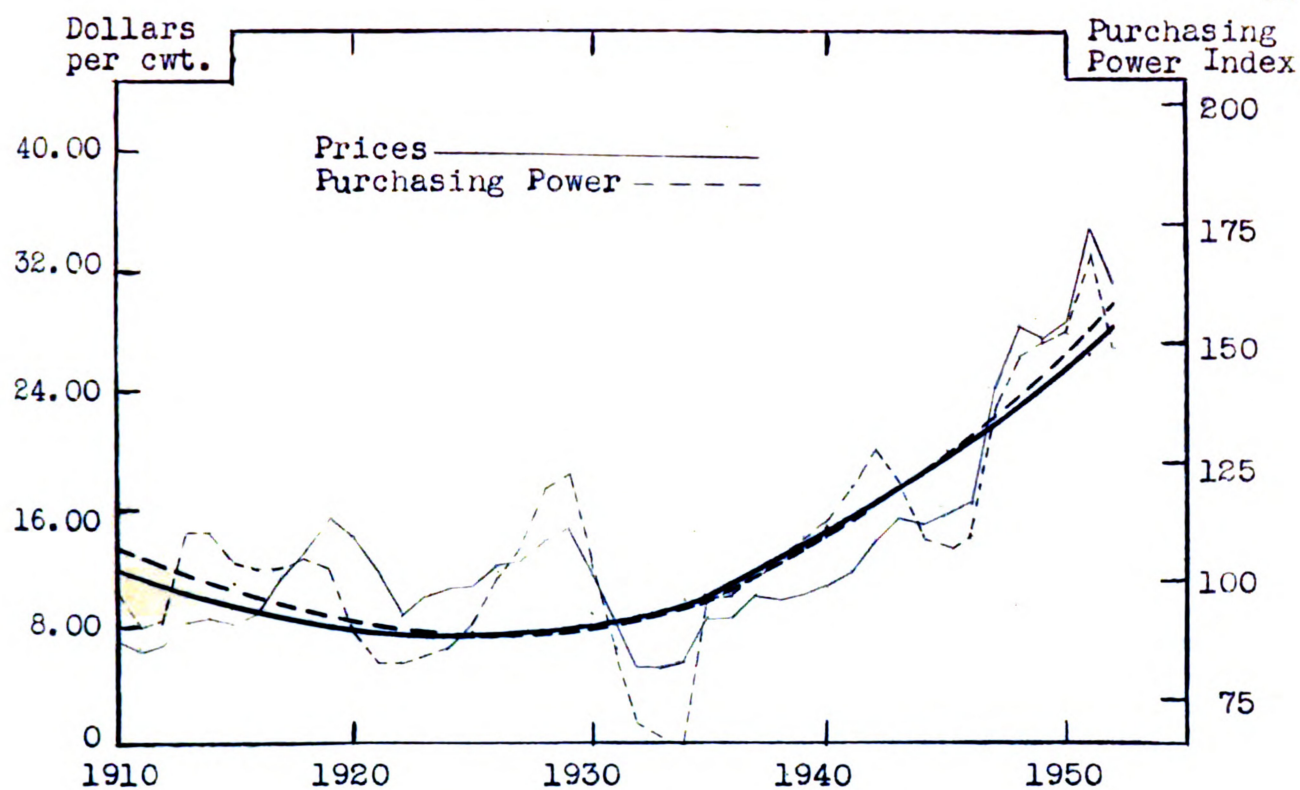Figure 34. LAMBS: Trends in Prices and Purchasing Power, 1910-1952.
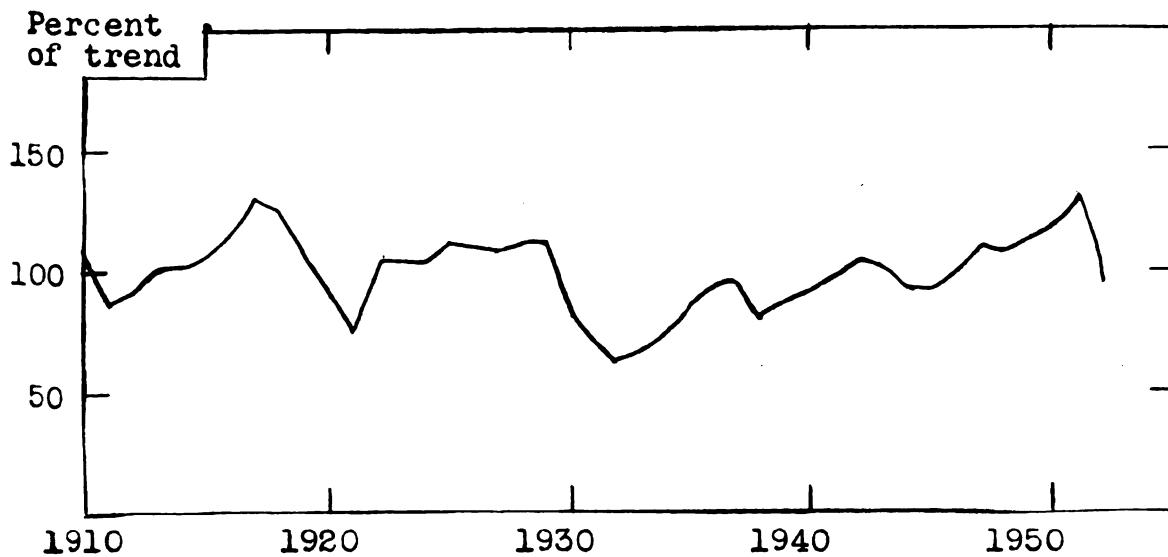
Figure 34a. LAMBS: Cycles in Purchasing Power, 1910-1952.

The purchasing power of sheep and lambs both experienced an initial decline (See Figs. 33 and 34). The early downward trend in purchasing power of sheep was largely a reflection of the reduced demand for mutton as a food due to a change in consumption habits from mutton to lamb. The early decline in purchasing power of lamb was not as severe as that of sheep mainly because of this trend towards consumption of more lamb as compared with mutton.

The strong upward trend in purchasing power of sheep in recent years was largely a reflection of an increased demand for such sheep by-products as pelts, lanolin, and tallow during World War II. The gradual increase in the purchasing power of lambs since 1924 appears to have been a result of this change in consumption habits towards more lamb as compared with mutton.

In summary, the more important factors affecting the price of sheep and lambs appear to have been the numbers of sheep and lambs on farms, the general business conditions, and the consumption of lamb and mutton.

Cycles in purchasing power of sheep and lambs have been rather irregular in magnitude and varied as to length (See Figs. 33a and 34a). This may be due to external influences such as wars and depressions which account for

many price changes that are interpreted as cycles. Cycles
of sheep and lamb purchasing power in Michigan vary from
6 to 11 years in length and average 8 years in length.
Peaks have occurred in 1918, 1926, 1937, 1943, and apparently
another peak is approaching at the present time.

Besides the influence of wars and depressions, the
production of sheep in the United States appears to have
been an important factor accounting for cycles in purchasing
power. Cyclical movements in numbers and purchasing power
are not uniform but they do appear to bear some relationship.
When sheep and lamb purchasing power was at a low level,
sheepherders tended to liquidate more of their breeding
stock. The resulting shortage of supplies in two to four
years forced sheep and lamb prices to a higher level again.
At this point sheepherders built up their herds, marketing
very few of their breeding stock, and in this way maintained
these higher prices for two to three years. The heavy
production that resulted from this practice was finally
let onto the market; the price was again forced down; and
the cycle repeated. This sequence of events was sometimes
altered by external factors such as abnormal price fluctuations
during wars and a depression, and by disease in sheep and
lamb flocks.

In general, the more important factors affecting the price cycles of sheep and lamb are the cycles in number on farms in the United States and Michigan, abnormal demands during wars and depressions, and variations in consumption habits.

Wool

Trends and Cycles in Prices. Prices of wool in Michigan
have experienced a gradual upward trend since 1910 (See Fig. 35).
In addition they have been characterized by high prices during
the two world wars and the Korean War and low prices during
the depression. The price of wool was very high during the
first world war because of the great quantities used for
military purposes. Prices did not rise proportionately
during the second world war because of the introduction of
many new synthetic fabrics. The low prices of the depression
were a reflection of not only the generally poor business
conditions which influenced prices of other products, but
also of the increased supply due to large numbers of sheep
on farms.

This steady upward trend in wool prices probably was
caused by the very high prices in 1950 and 1951. These
prices were a reflection not only of good business conditions
but also of increased demands for wool for military use in
the Korean war and the reduced supply due to low numbers
of sheep on farms in the United States and Michigan.

Wool prices in Michigan have been influenced by the
abnormal demands during wars together with the world
production of sheep and wool.

Cycles in the price of wool were not clearly evident
but there were periodic upward movements which averaged
8 years in length and resembled a cycle (See Fig. 35a).
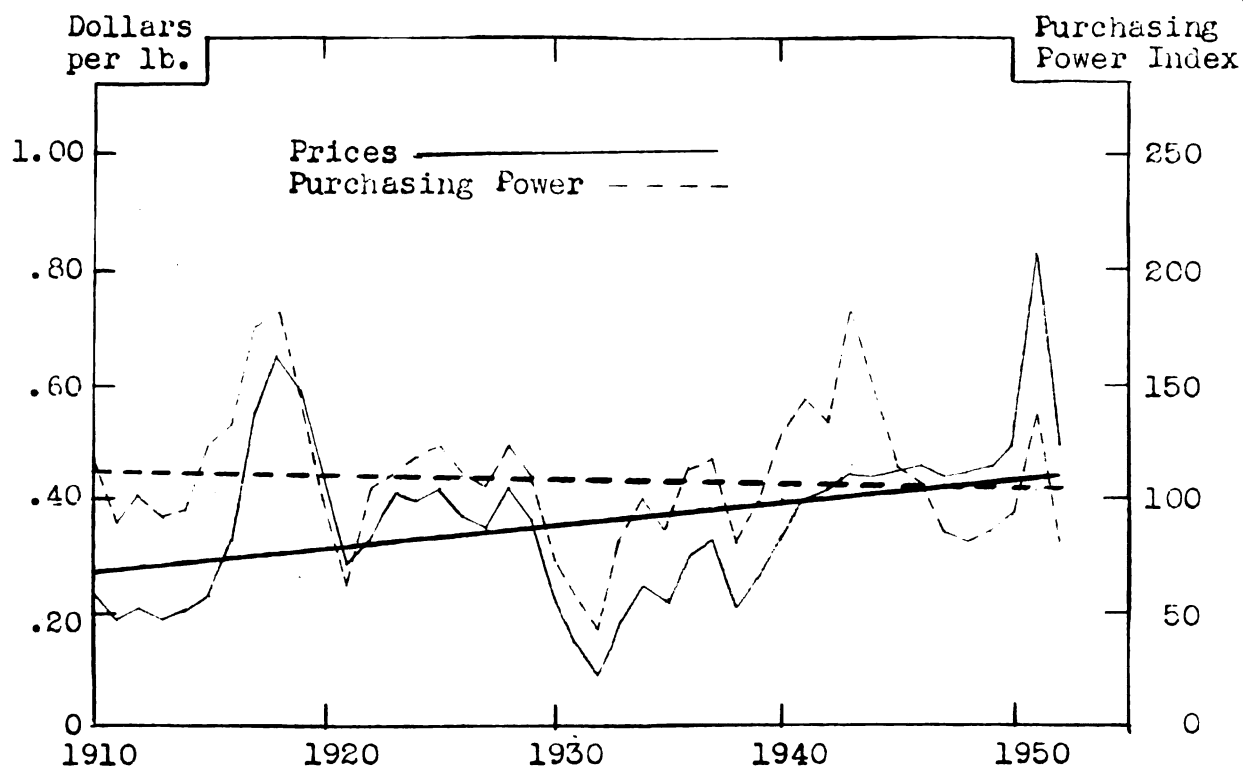
Figure 35.   WOOL: Trends in Prices and Purchasing Power,
                1910-1952.
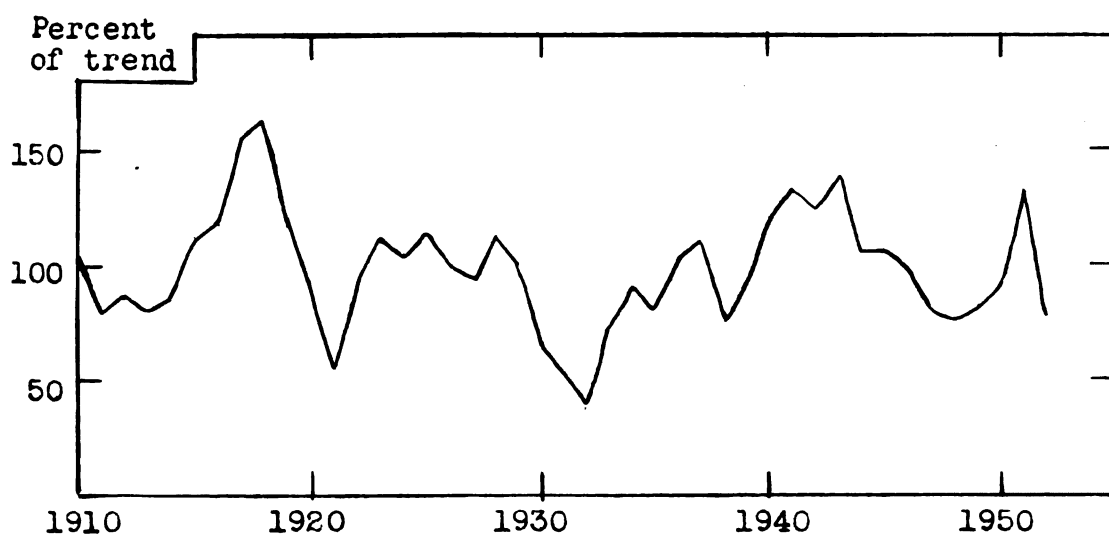
Figure 35a.   WOOL: Cycles in Purchasing Power, 1910-1952.

The cyclical peaks in prices occurred in 1918, 1926, 1936, 1943, and another peak is apparently approaching at the present time. This cycle in wool prices was only partially explained by cycles in numbers of sheep on United States farms producing wool. Other factors such as the world production of sheep and wool, general business conditions, and abnormal demands during wars have all played a part in causing this cyclical-like movement in the purchasing power or real price of wool.

Trends and Cycles in Production. The long-time downward trend in production of wool in Michigan was associated with the steadily decreasing numbers of stock sheep on Michigan farms (See Fig. 36). The decline in wool production of 80 percent from 1910 to 1951 corresponds very closely to an 81.8 percent decline in the number of stock sheep on Michigan farms during a comparable period. This reduction in sheep numbers and wool production was largely explained by alternative farming opportunities which have proved more profitable to Michigan farmers in recent years.

The apparent cyclical movements in the production of wool were influenced almost entirely by the number of stock sheep on farms in Michigan. Peaks in these movements were found in 1911, 1918, 1931, and 1937. Since wool is a by-product of sheep production in Michigan, the cyclical-like fluctuations in wool production were caused primarily by cycles in the numbers of sheep.
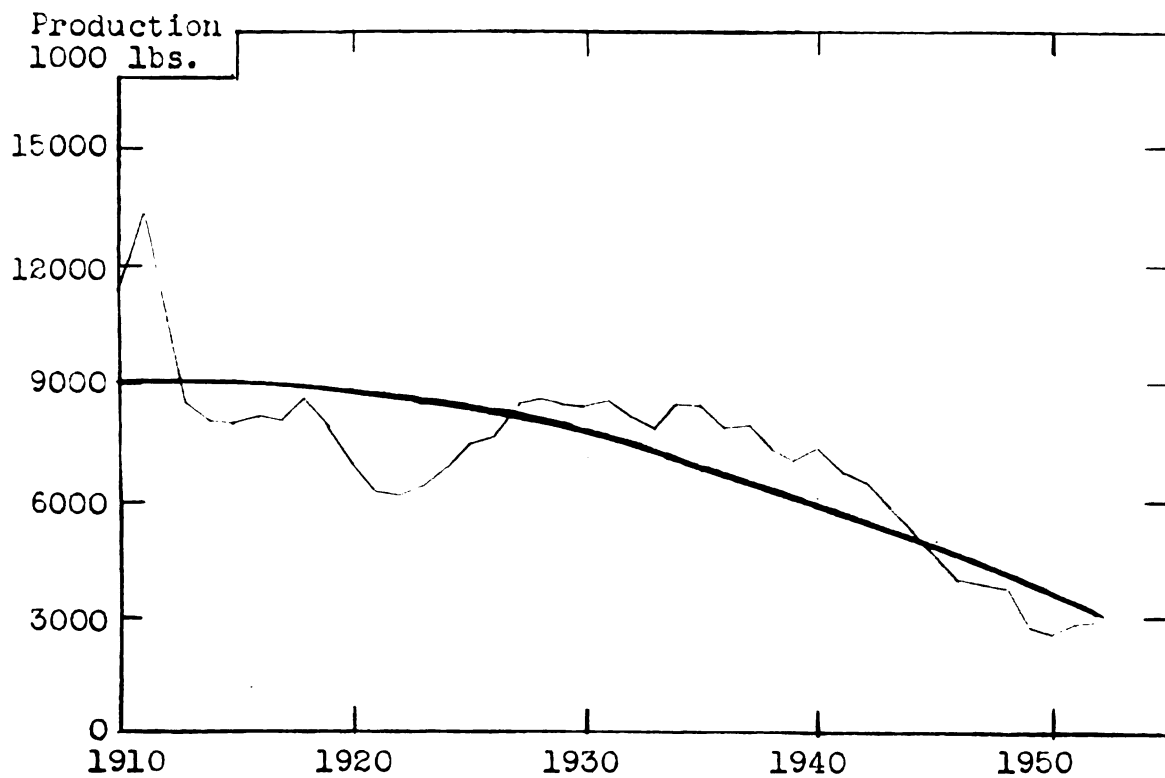
Figure 36.   WOOL: Trends in Production of Wool, 1910-1952.
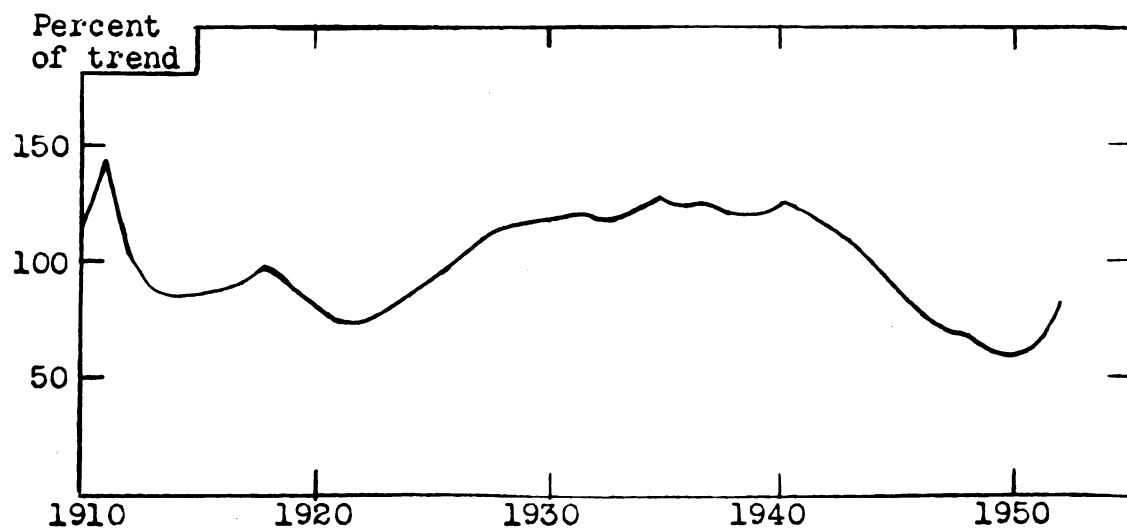
Figure 36a.   WOOL: Cycles in Production of Wool, 1910-1952.

Chicken and Eggs

Trends and Cycles in Prices. Although prices of
chickens and eggs have been very noticeably influenced
by two world wars and a depression, a steady upward trend
was evident from 1910 to 1952 (See Figs. 37 and 38). This
upward trend was largely a result of the high chicken and
egg prices during World War II. The increased demand for
chickens and eggs along with the large purchases of eggs
by the government for the military forces during World
War II increased prices substantially.

Government programs have been of importance in causing
the upward price trend. From 1933 to 1941, government
purchases amounting to nearly 2 percent of the United
States production of eggs were made in order to improve
producer returns. The eggs bought were distributed to
low income families or to schools through the free lunch
program. Government purchases of eggs during World War II
for food use in the armed forces increased from 10 million
pounds of dried eggs before the war to 300 million pounds
of dried eggs after the war. The purchases of eggs by the
government in 1944, and 1947 through 1950, also contributed
to higher prices for eggs. Although the government has
been quite active in supporting the price of eggs, it has
done very little to directly support the price of chickens.
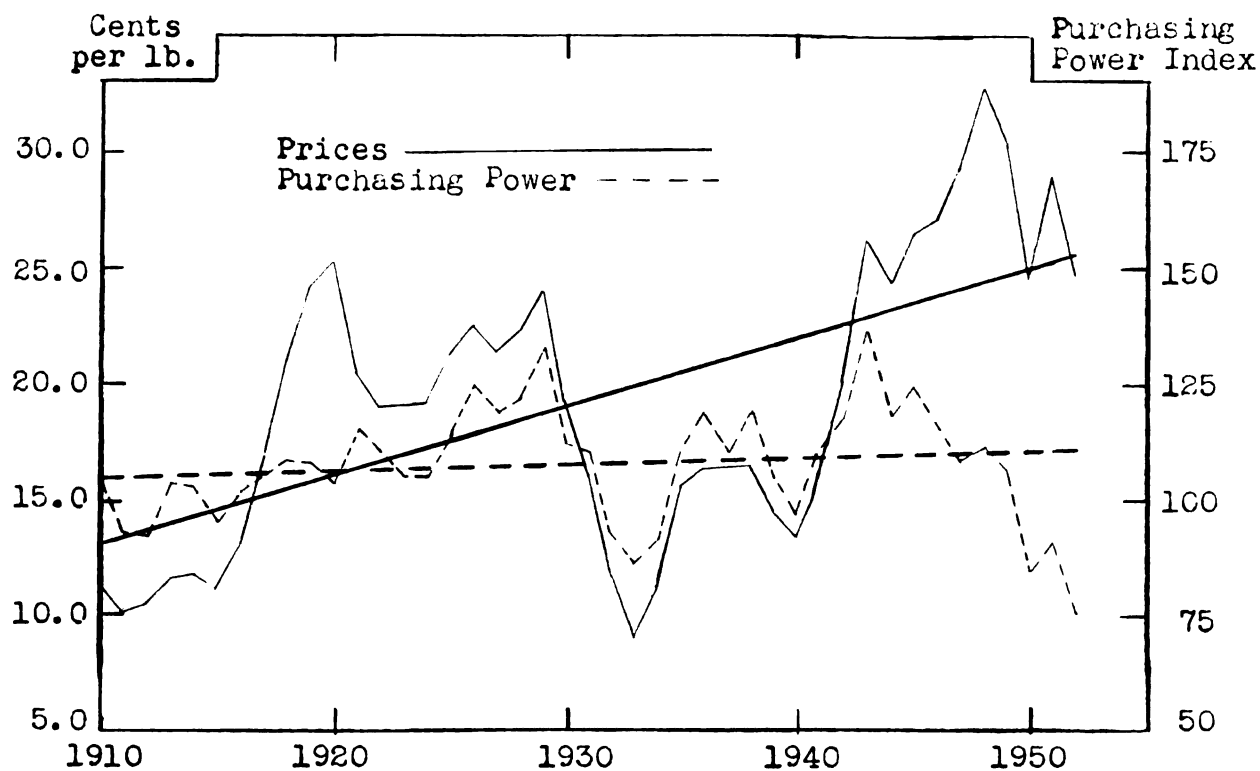
Figure 37. CHICKENS: Trends in Prices and Purchasing
Power, 1910-1952.
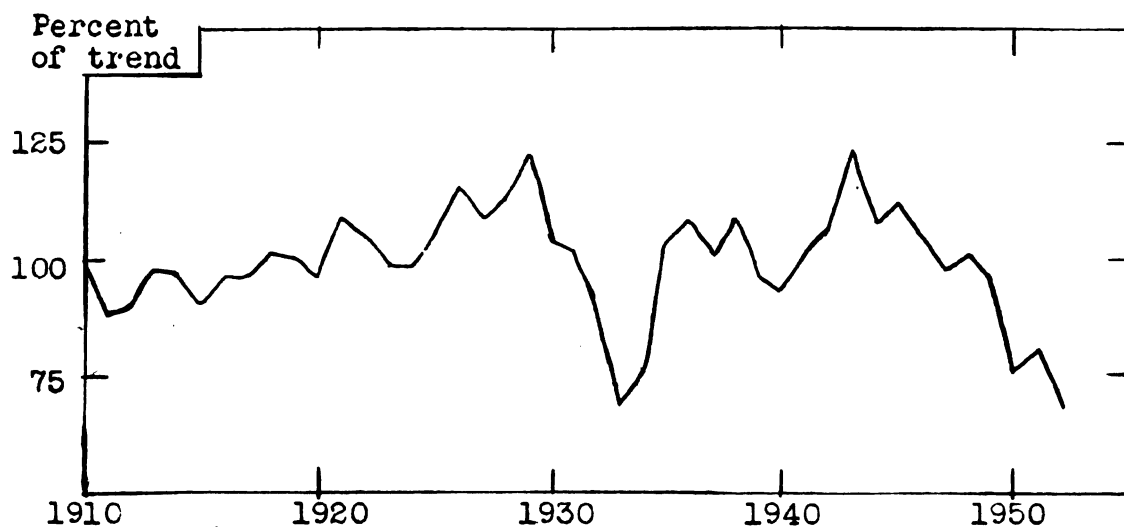
Figure 37a. CHICKENS: Cycles in Purchasing Power,
1910-1952.
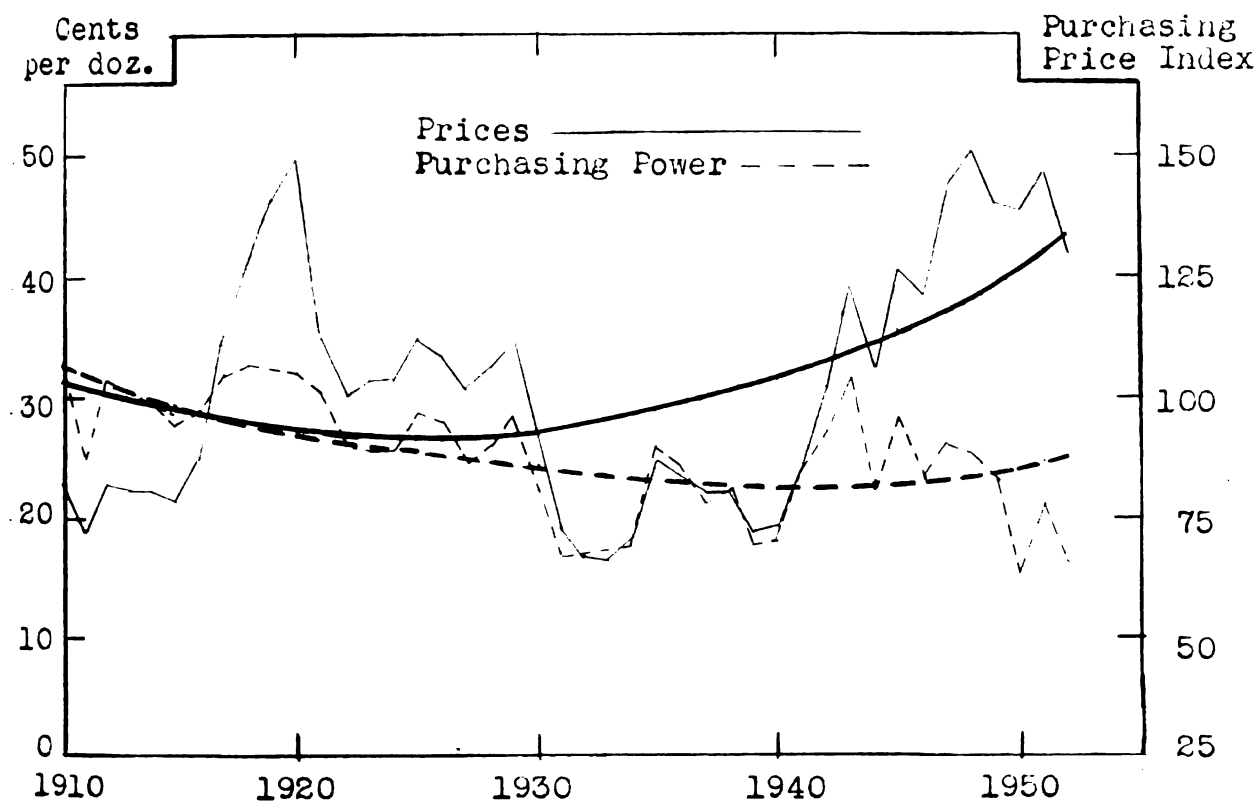
Figure 38. EGGS: Trends in Prices and Purchasing Power,
1910-1952.
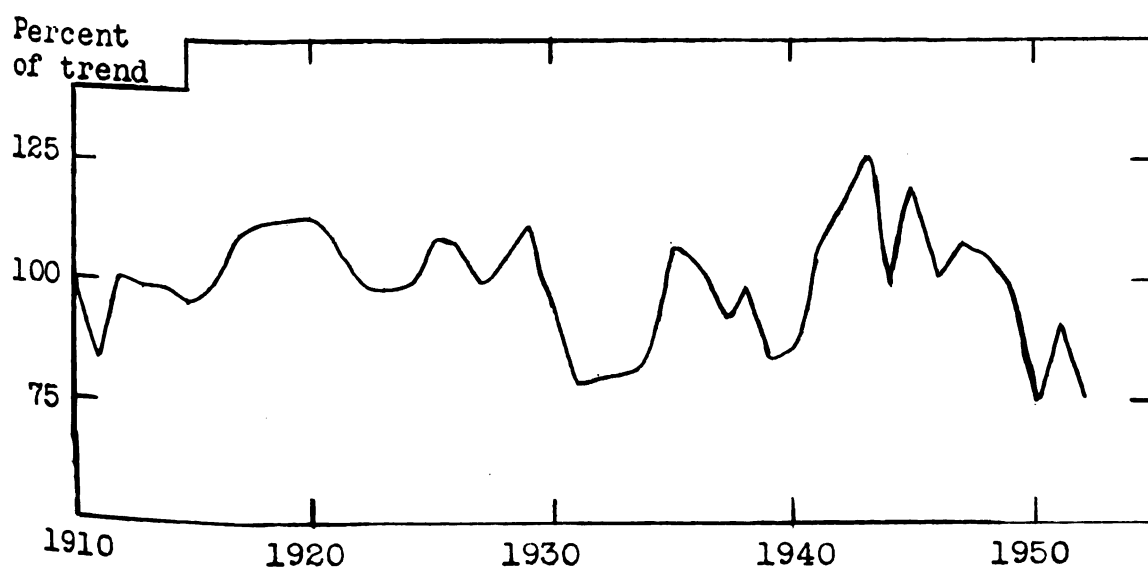
Figure 38a. EGGS: Cycles in Purchasing Power,
1910-1952.

The purchasing power of chickens has been rising gradually since 1910. This appears to have been a reflection of the high consumer purchasing power in recent years which caused a greater demand for chickens, often regarded as a luxury food item.

The purchasing power of eggs has trended downwards since 1910 with a leveling-off since 1944. Eggs are almost a standard food item, consequently it is doubtful whether higher consumer purchasing power increased the demand for eggs substantially. As a result economic changes which raised all prices in general apparently caused a decline in the purchasing power of eggs.

The most significant factors affecting prices of chickens and eggs appear to have been changes in consumer purchasing power, and purchasing programs carried out by the government.

Cycles in the purchasing power of chickens and eggs are very obscure and there may be some doubt as to the existence of true cycles. However peaks in purchasing power appear to have been reached in 1912, 1920-22, 1925-26, 1929, 1936, 1938, 1943, 1945, and 1948. There fluctuations varied in length from 2 to 8 years and averaged about 4-5 years.

There has been very little consistency in the length and amplitude of price cycles in chickens and eggs. Changes in the production and supply of chickens and eggs can be brought about rapidly due to the nature of the poultry enterprise. Such factors as cost of production in relation to prices received from chickens and eggs apparently have prompted many farmers to alter production periodically, and it appears to have been these resulting changes in supply that caused the cyclical-like movements in the real price of chickens and eggs.

There has been very little agreement among price analysts as to the existence of a true cycle in prices or purchasing power of eggs in United States.[1] Although cycles in chicken and egg prices in Michigan have been highly irregular, they appear to have been caused by internal forces and so can be termed a true cycle.

Trends and Cycles in Production. Due to the widely fluctuating nature of the number of chickens on farms in Michigan, there does not appear to have been any significant trend.(See Fig. 39). The most striking characteristic of this series of annual data has been the decline in numbers of chickens on Michigan farms from 155 million to 102 million between 1944 and 1949.

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[1]Thomsen, op. cit., p. 414.

No. of Chickens
100,000
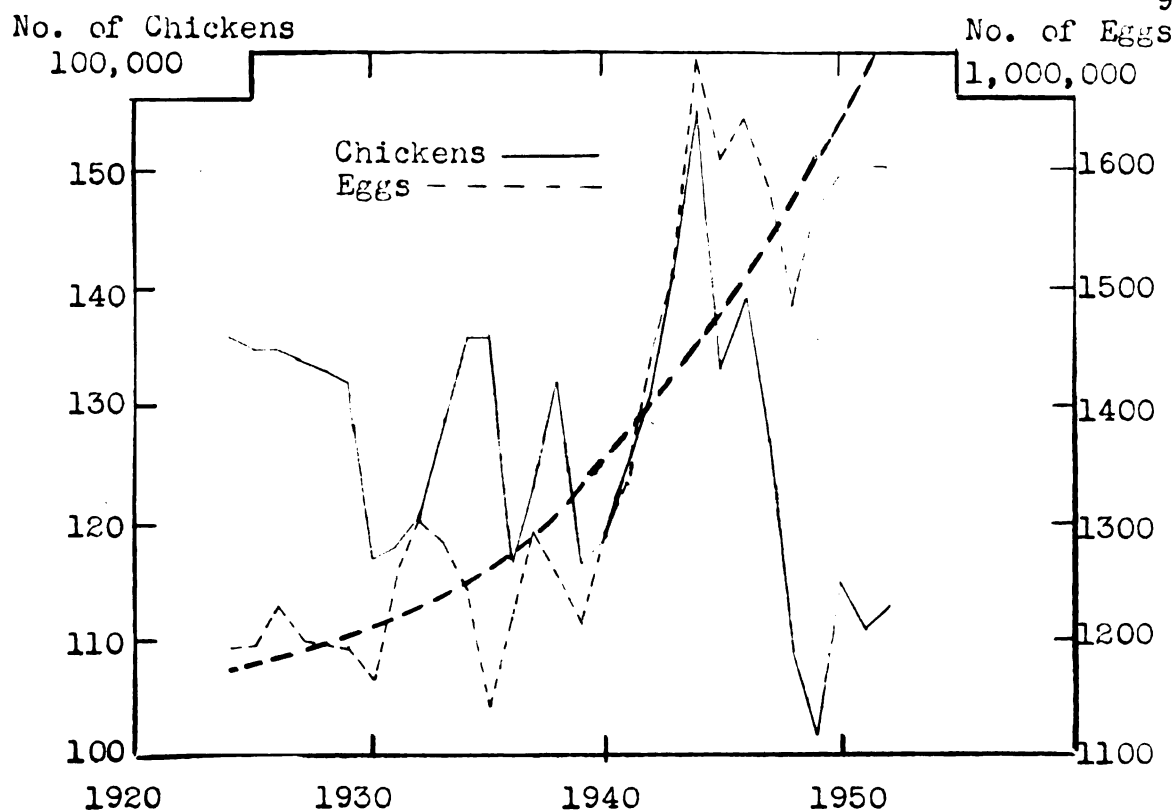
No. of Eggs
1,000,000

Figure 39. CHICKENS AND EGGS: Trends in Production, 1910-1952 (no significant trend for chicken numbers)

Chicken Nos. percent

Egg Nos. Percent of trend
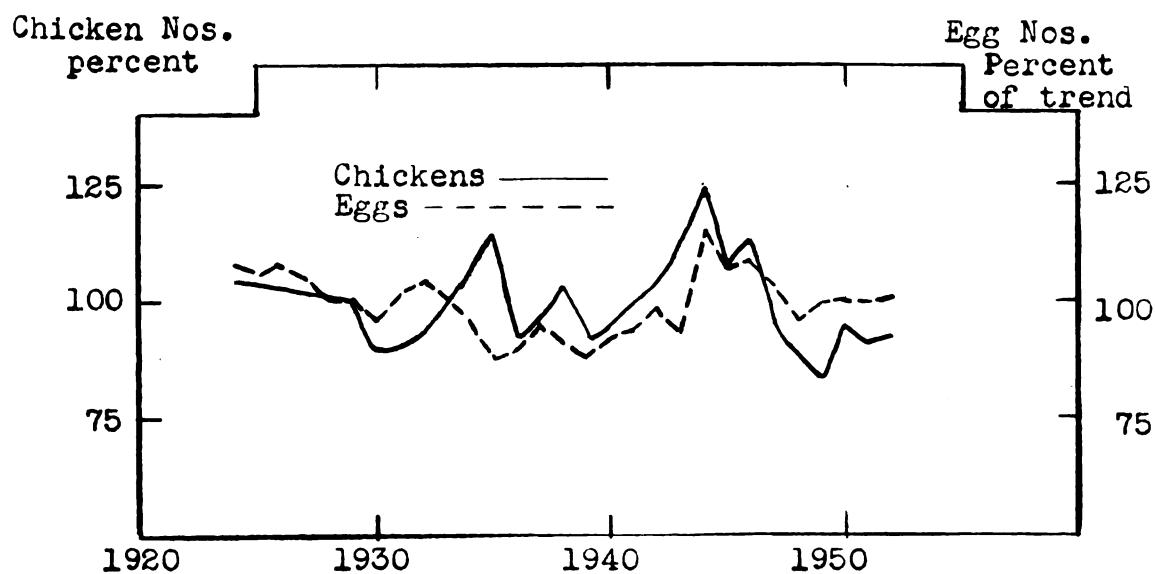
Figure 39a. CHICKENS AND EGGS: Cycles in Production, 1924-1952.

The trend in production of eggs in Michigan was strongly upwards. Although variations in egg production followed fluctuations in numbers of chickens on farms, the trend in egg production advanced much more rapidly than numbers of chickens. The greatly increased production of eggs since 1937 was due to the fact that production per bird increased from 121 eggs per hen per year in 1930 to 167 eggs per hen per year in 1950. This increased yield was due to better management practices, more adequate feeding practices, and improved breeds of egg-layers.

There was a tendency for chicken numbers and egg production to move in cycles. However the limited data used in this study does not warrant the drawing of definite conclusions. Peaks of production apparently were reached in 1927, 1932-33, 1937, 1943, and in 1946. These cycles varied from 3-5 years in length and averaged about 5 years.

The occurrence of cycles in chicken numbers and egg production were associated with cycles in prices of these products. When prices were high, farmers increased production, and the marketing of this increased production forced prices down. Later when a shortage of supplies developed, prices rose again, and the cycle was repeated. As a result Michigan experienced fairly regular cycles in the production of these poultry products during the years included in this study.

Milk Cows

Trends and Cycles in Numbers on Farms. Numbers of
milk cows on Michigan farms have increased at a rapid rate
since 1910 (See Fig. 40). This upward trend in numbers of
cows can be accounted for largely by the rapid increase in
population which has taken place in Michigan and particularly
in the Detroit area since 1910. The resulting increased
demand for fluid milk and dairy products raised dairy prices
considerably and made dairy farming an increasingly profitable
enterprise in Michigan. The profitability of selling fluid
milk apparently has caused the rapid increase in milk cow
numbers.

The upward trend in numbers of milk cows was modified
by slight cyclical fluctuations which corresponded with the
cycle in beef cattle numbers in the United States.[1] This
cycle appears to have been a result of the dual purpose
animal kept for the production of both beef and milk, and
also a result of the influence of the cycle in beef prices
on the culling out of old dairy animals.

The more important factors affecting the numbers of
milk cows on farms have been the higher prices of dairy
products due to the greater demand from the increasing
population, and the prices of beef cattle or cows for beef.

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[1]Cf. Thomsen, op. cit., p. 414.

No. of Milk Cows

1,000

1100

1000

900

800

700

600

1910   1920   1930   1940   1950
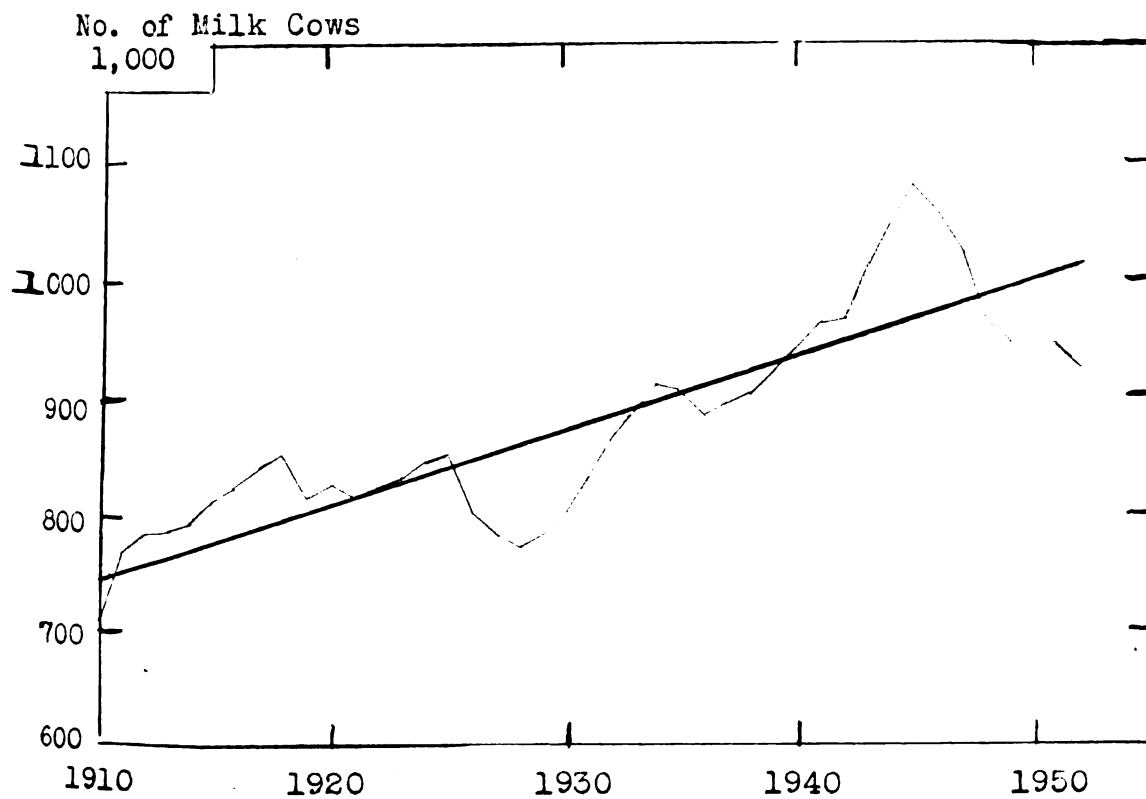
Figure 40.   MILK COWS: Trends in Numbers on Farms,
1910-1952.

Percent
of trend

125

100

75

1910   1920   1930   1940   1950
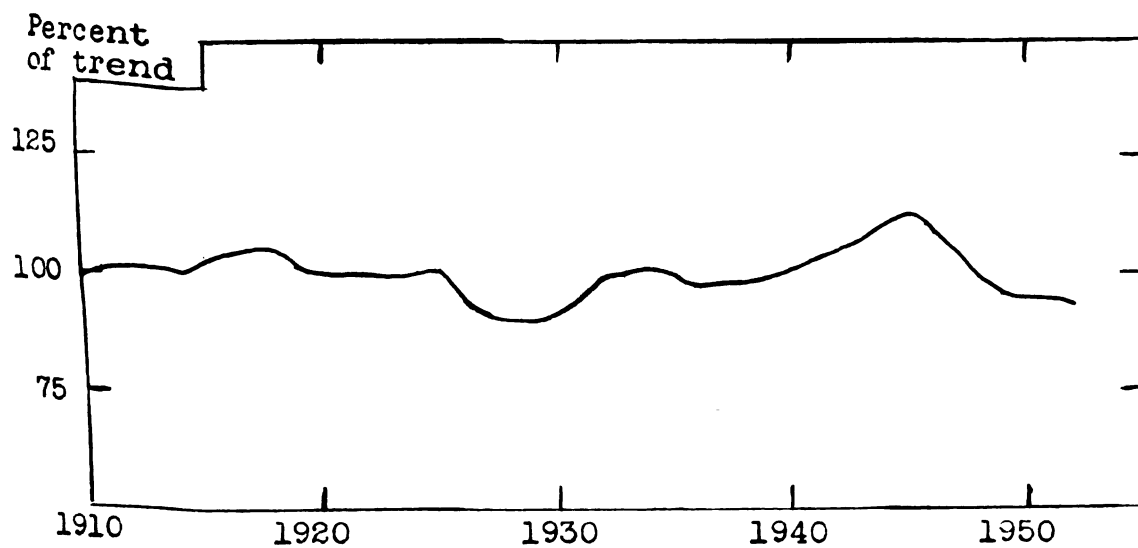
Figure 40a.   MILK COWS: Cycles in Numbers on Farms,
1910-1952.

Milk

Trends in Prices and Purchasing Power. The price
trend of milk in Michigan was characterized by an initial
decline in milk prices and then a strong rise in prices.
Fluctuations about this trend followed closely the move-
ments in business conditions (See Fig. 41). Consequently
in Michigan, business conditions and consumer purchasing
power appear to have significantly influenced the trend
in milk prices.

Other important factors influencing milk prices may
have been the increased per capita consumption of milk and
the increased population, which has raised the demand for
milk, and as a result, the price of milk. The price of
feed also influenced to a certain extent the production
of milk, because farmers can expand or contract production
according to the relative price of feed and milk by varying
the amount of feed per cow.[1] This has affected the supply
and consequently the price of milk.

In general the more significant factors affecting the
price of milk in Michigan appear to have been consumer
purchasing power, the increasing demand due to population
increases and higher per capita consumption of milk, and
the supply of milk in Michigan.

[1]Thomsen and Foote, op. cit., p. 422.
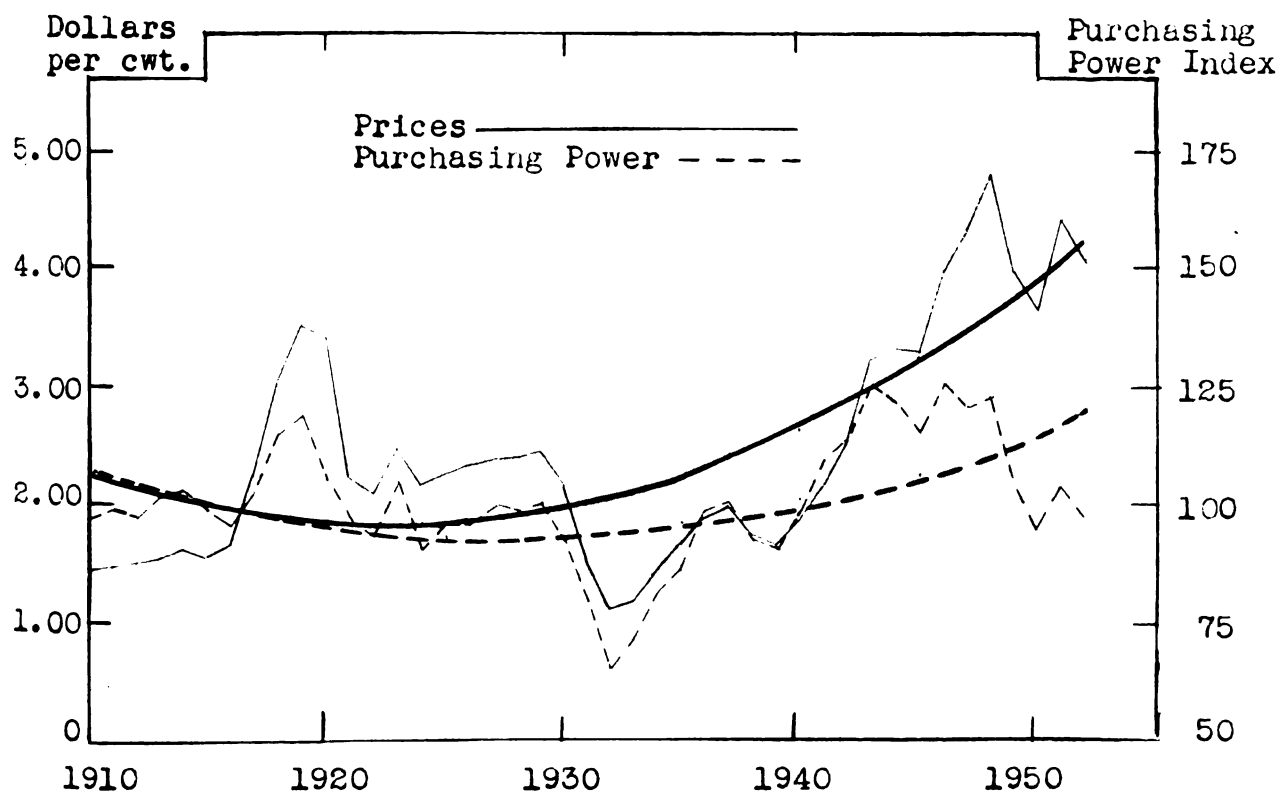
Figure 41. MILK: Trends in Prices and Purchasing Power, 1910-1952.

The trend of purchasing power was downward from 1910 to 1930, and was due primarily to the reduced purchasing power of consumers during the depression and hence a reduced demand (See Fig. 41). Production continued to increase during this period so that the real price was lowered still further by the oversupply.

The upward trend of purchasing power since 1930 appears to have been due partly to the greatly increased purchasing power of consumers following the depression low and partly to the greatly increased demands arising from the rapidly rising population.

The most significant factors affecting the trend in the purchasing power of milk have been disposable consumer income, the annual production of milk, and the increasing demand for milk due to both a higher per capita consumption and a rapidly rising population.

No significant cycles were evident in the purchasing power of milk. This is largely a reflection of the fact that milk production, which is the most significant factor causing cycles in prices, can be expanded or contracted by varying feeding practices. Thus the basic cause of cycles in purchasing power of milk, namely production, has been eliminated.

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[1] Lorie, J. H. Causes of Annual Fluctuations in the Production of Livestock and Livestock Products. University of Chicago Press, Chicago, (1947), pp. 63-65.

Trends in Milk Production (1924-1952). The rising

trend of production of milk in Michigan appears to have

been a reflection of both greatly increased numbers of

milk cows on farms (Fig. 40) and a steady upward trend

in production of milk per cow (Fig. 42). Of these two

factors, the increased numbers of milk cows probably

accounted for the greater part of this upward trend in

production, while increased yields per cow had a lesser

effect.

Milk production was also affected by the relationship

of the price of butterfat to the price of feed. When

butterfat prices were high relative to feed prices,

dairymen fed more heavily so as to increase production

and hence total returns. When the price of butterfat

was low relative to feed prices, producers took poorer

care of their herds and fed less intensively.

There does not appear to have been any evidence of

cycles in milk production in Michigan. This is largely

a result of the fact that production of milk can be

altered by varying the amount of feed per cow, which as

was pointed out above, removes the basic cause of the

cycle. Production was influenced primarily by numbers

of milk cows on farms and production per animal.

Trends in Milk Production Per Cow (1924-1952). The
steadily rising trend in production of milk per cow has
been a result of several factors. Of major importance
has been the improved feeding practices of recent years.
This includes the use of more alfalfa as a roughage, the
increased use of grass silage as a pasture supplement,
the increased feeding of concentrates, and the improvements
in pasture programs. A second factor has been the culling
out of poor producers so that the average yield per cow
has been higher. The Artificial Breeders Association has
also aided in providing higher producing cows so that the
average yield has been higher. Probably no single factor
can be distinguished as being of major importance as this
increase in yield appears to have been a result of a
combination of all these factors.

Again as in total production of milk, there does not
appear to have been any cyclical movement in the production
of milk per cow. Fluctuations in yield from year to year
have been very limited and somewhat erratic due to the
fact that the quantity and quality of feed available varies
somewhat from year to year.

Milk Production per Cow   Total Milk Production
        pounds   1,000,000 lbs.

Production per cow ————
Total production — — — — —

6300   6000

6000   5500

5700   5000

5400   4500

5100   4000

4800   3500

1920   1930   1940   1950
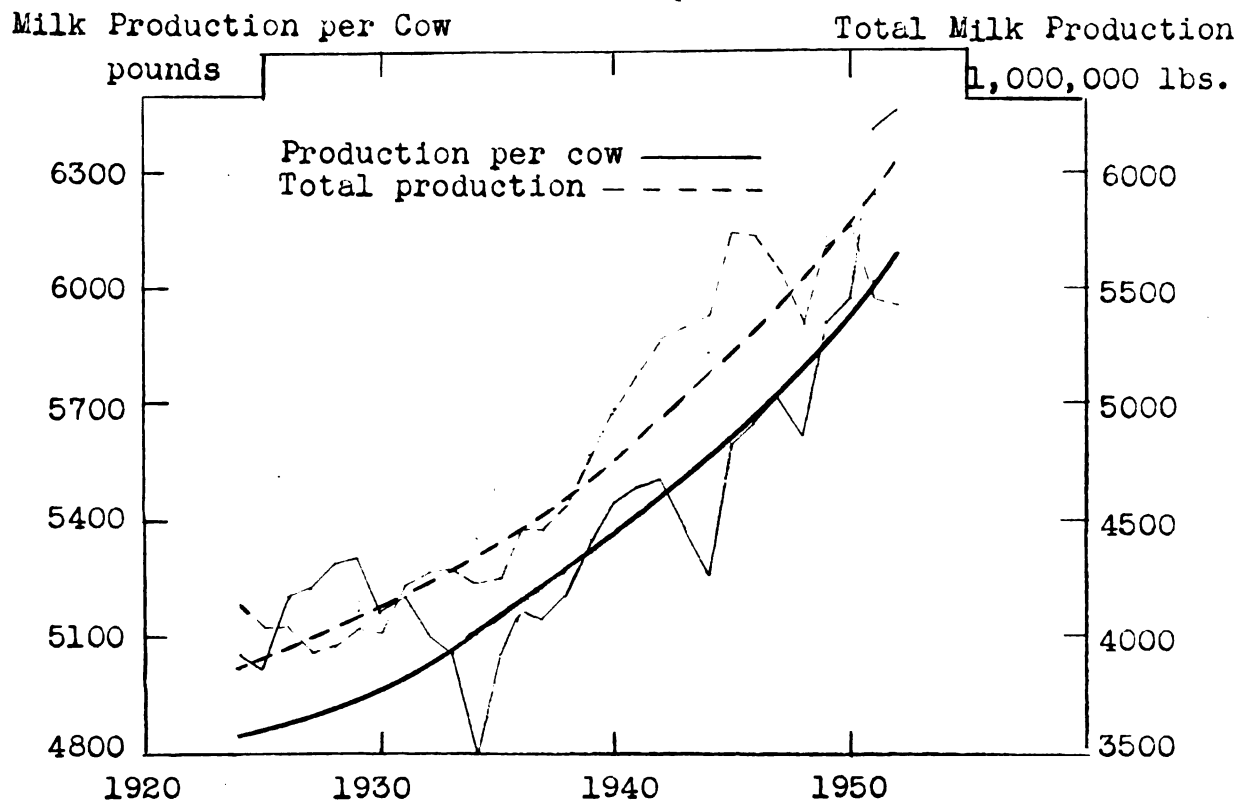
Figure 42.   MILK: Trends in Production and Production
                per Cow, 1924-1952.

Butter and Butterfat

Trends in Prices and Purchasing Power. The steadily
rising trend in the price of Michigan creamery butter was
closely associated with changes in business conditions,
and also with disposable consumer income (See Figs. 43 and
44).

Butterfat is the basis upon which cream is usually
purchased for butter manufacturing. Consequently variations
in prices of these two commodities have been almost identical.
The price of butterfat has moved upward largely because of
the influence of high butter prices and high fluid milk
prices. The trend of butterfat prices appears to have
been different from the trend of butter prices only because
the data for butterfat is limited to the period 1921 to
1952 as compared with 1910 to 1952 for butter. This
relatively shorter period caused undue emphasis by the
depression and thus accounts for the dip in the prices
trend during the thirties. If the data had extended
over the same period as was available for butter, it is
quite possible that prices trend of butter and butterfat
would have been almost identical.

The most important factors affecting the price of
butterfat appear to have been butter prices and milk

Dollars per lb.

Purchasing Power Index

Prices ———
Purchasing Power — — —

.75 — 150
.60 — 125
.45 — 100
.30 — 75
.15 — 50
0 — 25

1910 1920 1930 1940 1950
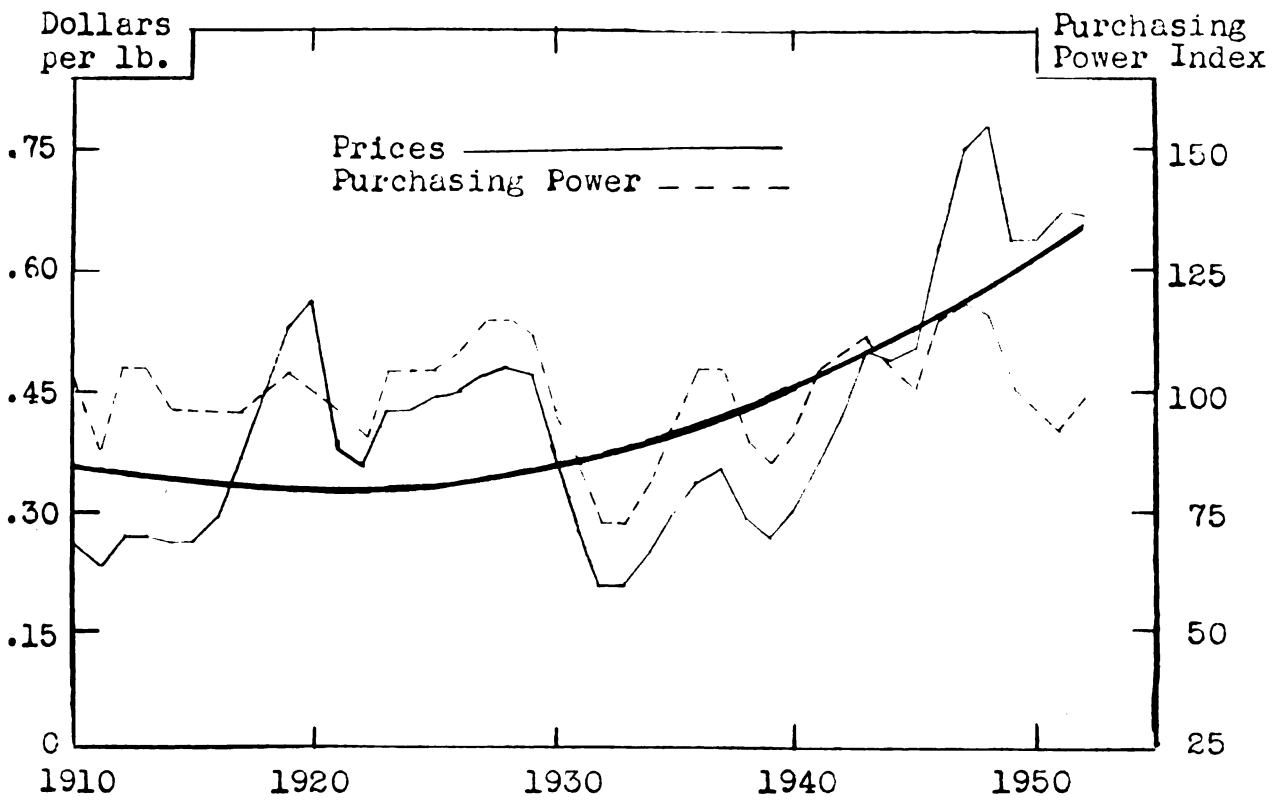
Figure 43. BUTTER: Trends in Prices 1910-1952. (no significant trend in purchasing power)

Dollars per lb.

Purchasing Power Index

Prices ———
Purchasing Power — — —

1.00 — 120
.80 — 100
.60 — 80
.40 — 60
.20 — 40
.10 — 20

1910 1920 1930 1940 1950
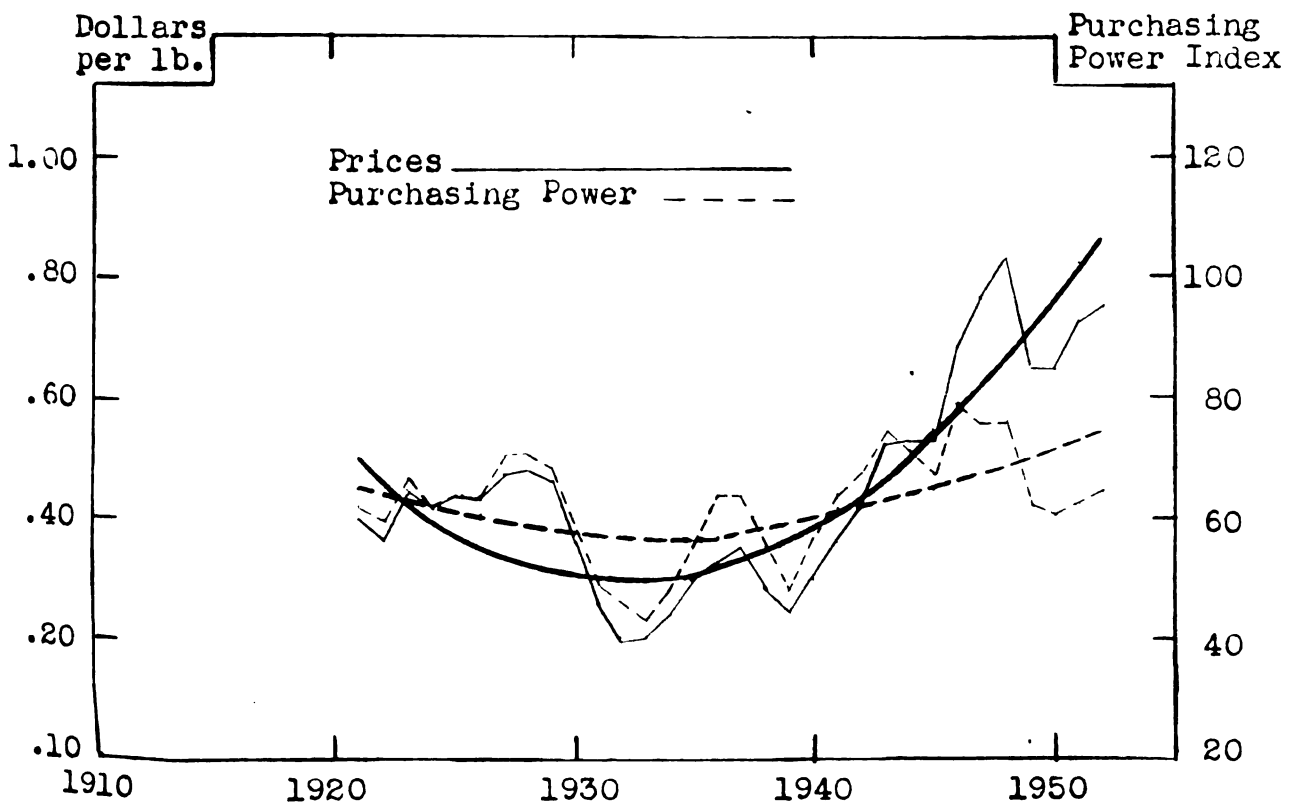
Figure 44. BUTTERFAT: Trends in Prices and Purchasing Power, 1921-1952.

prices while factors influencing the price of butter have included a combination of the increased consumer purchasing power, the price of oleomargarine, and loans made through the Commodity Credit Corporation to support butter prices in 1938 and 1939.

There has been no significant trend in the purchasing power of butter since 1910. Year to year variations in purchasing power since 1940 were accounted for partially by variations in production. However this relationship was not sufficiently distinct to term these fluctuations cycles.

The annual variations in the purchasing power of butterfat in the limited data available (1921-1952) were again similar to those of butter for the corresponding period, due largely to the interrelations of these products. Although a trend in the real price of butterfat is discernible this appears to have been influenced more by the low consumer purchasing power during the depression. If the data had included the entire period 1910-1952, the trend may have been modified considerably.

Trends in Production. The initial upward trend in butter production followed the increase in milk production during these years (See Fig. 45). From 1922 to 1935, the

Production
10,000 lbs.

9000

8000

7000

6000

5000

4000

3000

1920   1930   1940   1950
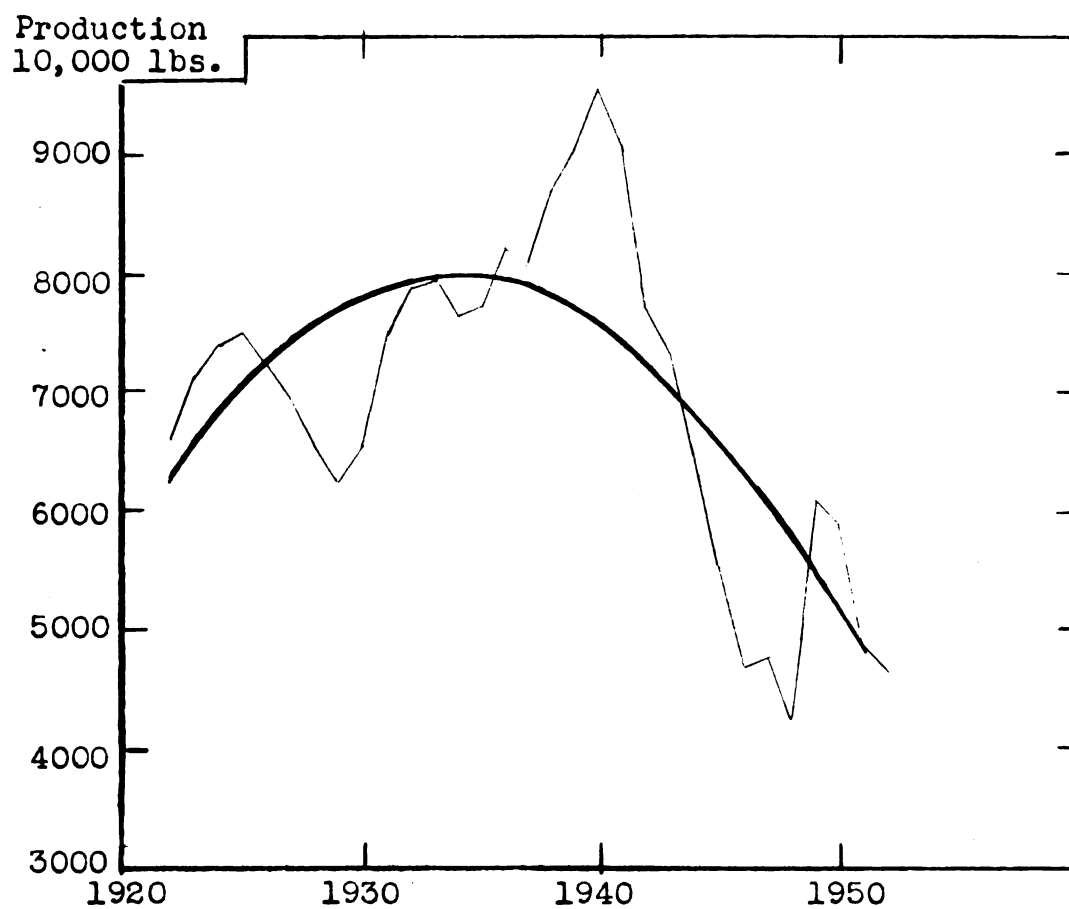
Figure 45.   CREAMERY BUTTER: Trends in Production,
1922-1952.

consumption of fluid milk and cream remained constant.[1]
The surplus resulting from the increased production of
milk and cream was manufactured into butter in response
to the high butter prices existing from 1923 to 1929. As
a result butter production increased substantially during
these years.

The sharp downward trend in the production of butter
particularly since 1940, has been a result of a combination
of several factors. First, the increased fluid milk and
cream consumption has reduced the amount of butterfat
available for butter production. Not only has there
been an increase in per capita consumption of fluid milk,
but the milk shed of Detroit has been expanding due to
the increase in population. Secondly, the higher price
of butter has caused the cheaper product, oleomargarine,
to be substituted, thus reducing the market for butter
and hence butter production. Thirdly, there has been a
movement of the condensary market into former cream markets,
which has again caused less butter to be produced.

In general, the more important factors affecting the
production of butter in Michigan have been the relationship
of feed prices to butterfat prices, the substitution of

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[1]Quackenbush, G. G. Milk Utilization Trends in Michigan.
 Michigan State College Agricultural Experiment Station
 Special Bulletin 372.

oleomargarine for butter, and the expanding population's
consumption of fluid milk and cream.

PART III

GROUPED PRODUCTS

Cash Crops[1] and Feed Grains[2]

Trends in Acreage. The acreage of cash crops harvested annually since 1910 has trended slightly downward (See Fig. 46). This decline in acreage was a reflection largely of two significant factors. The higher price offered for these cash crops in recent years and the higher yield obtained from them has allowed Michigan farmers to maintain or increase their returns from a slightly lower acreage. In addition to this, legislation was passed in 1936 which granted certain acreage payments to farmers if they complied with the soil conservation program in reducing acreages of cash crops and feed grains. It would appear that a combination of these two factors had led to the slight decline in the acreage of cash crops in Michigan.

The acreage of feed grains followed a downward trend very similar to that of cash crops (See Fig. 46). This is to be expected since the acreage of feed grains is influenced by the same factors that influence the acreage of cash crops;

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[1]Includes wheat, sugar beets, field beans, and potatoes.

[2]Includes corn, oats, and barley.

namely, the higher yields which have increased production
utilizing fewer acres, the acreage allotment program
included in the price support program, and the reduction
in acreages induced by the soil conservation program.
Besides these factors, the acreage of feed grains moved
in accordance with the demand from livestock and hog growers,
and with their respective cycles of numbers on farms.

Trends in Production. The production of cash crops
in Michigan experienced an upward trend since 1920, influenced
primarily by an increase in production of 20 percent since
1935 (See Fig. 47). This increased production was mostly
accounted for by two major factors. The introduction of
new and improved higher yielding varieties of seed,
resistant to disease and lodging has increased production
substantially since 1935. The government price support
program guaranteed a price for cash crops to farmers such
that it made it practical to use greatly increased quantities
of fertilizer and to adopt more intensive cultivating
practices in order to increase production. Although these
factors have been of importance in explaining the upward
trend of production, the annual fluctuations in the pro-
duction of cash crops appear to have been a reflection
largely of variations in the Michigan acreage of cash crops.
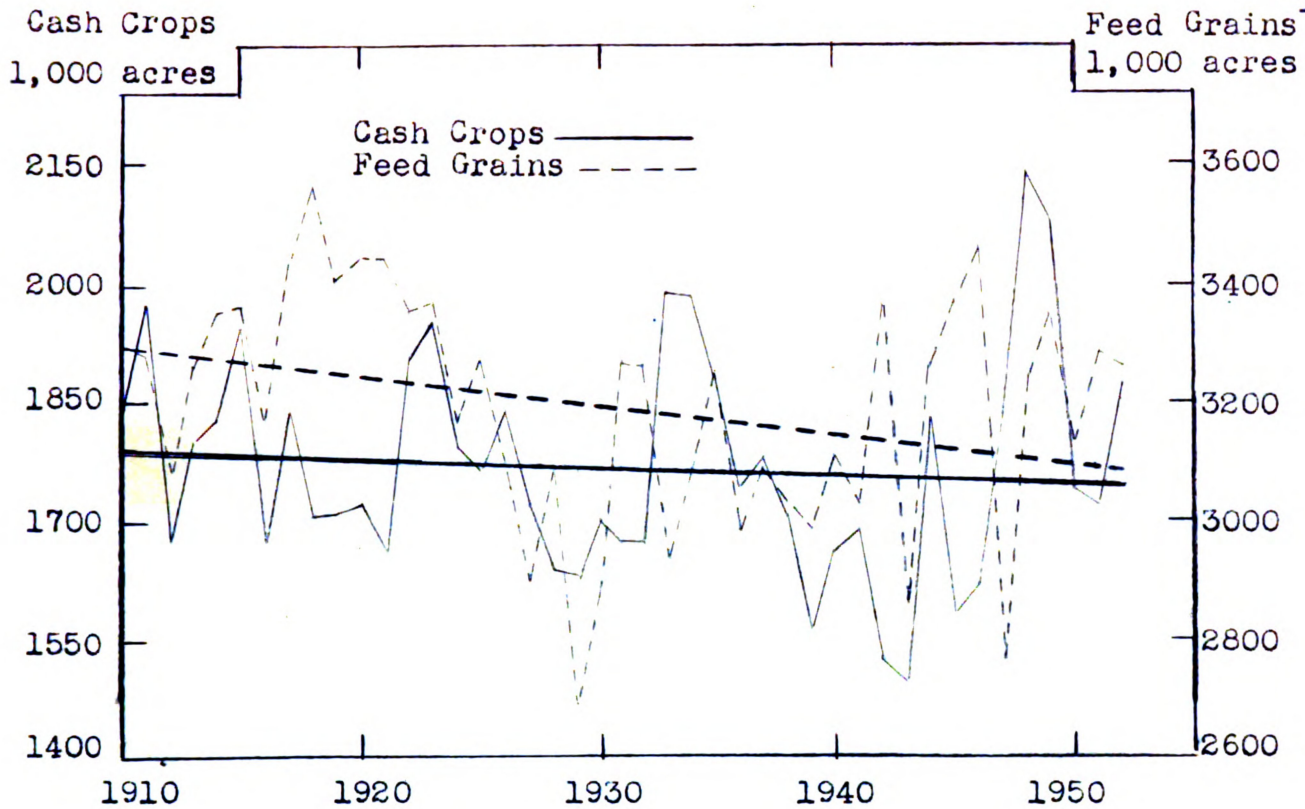
Figure 46.　CASH CROPS AND FEED GRAINS:　Trends in Acreage, 1910-1952.
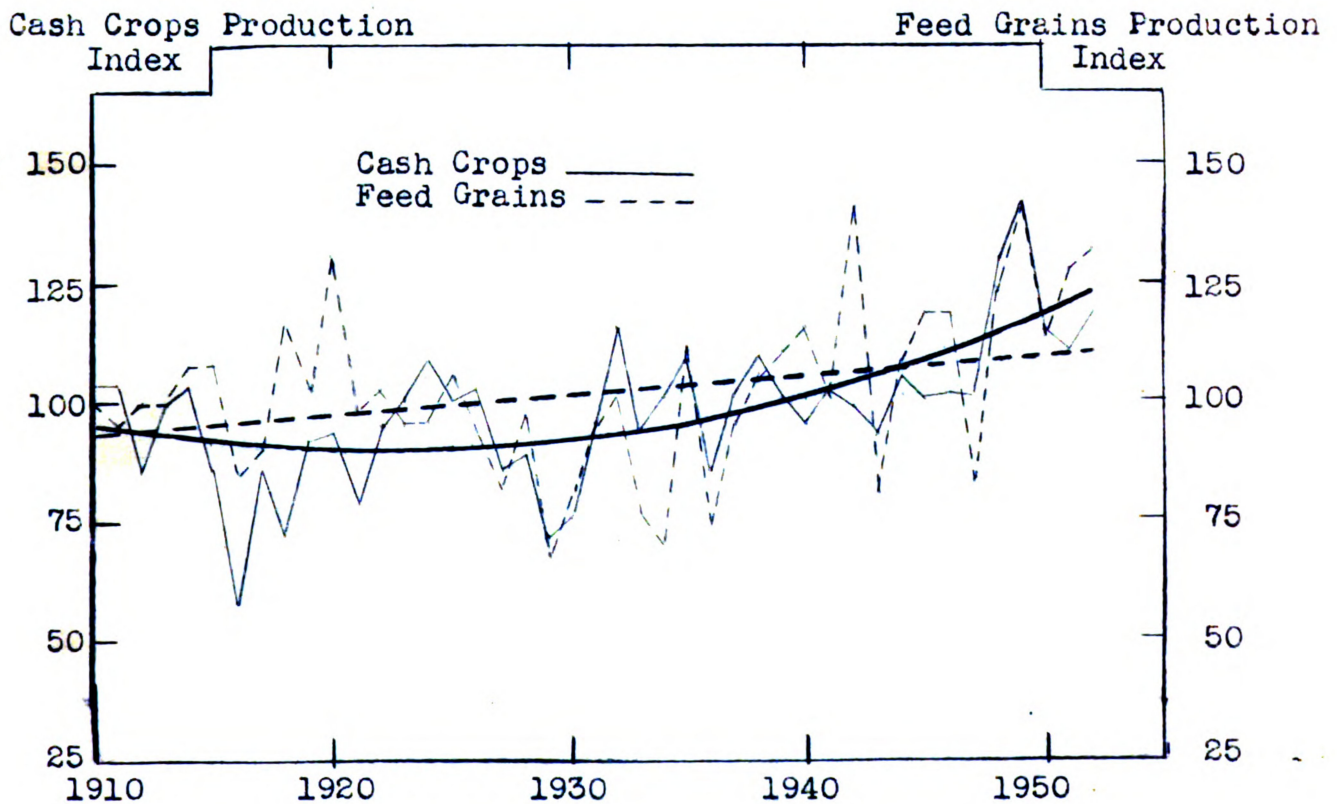
Figure 47.　CASH CROPS AND FEED GRAINS:　Trends in Production, 1910-1952.

Although the production of feed grains in Michigan experienced an upward trend, this tendency has not been as great in recent years as that of cash crops. As with cash crops, this increase was a result of the introduction of higher yielding varieties (hybrid seed in the case of corn), the increased use of fertilizer, and more intensive cultivating practices.

The production of feed grains did not increase as rapidly as that of cash crops because of the higher prices of cash crops in recent years. The high labor costs increased the cost of production of livestock and hogs substantially, thus making it more profitable to produce cash crops which require relatively less labor. This appears to have been a major factor in causing an increase in production though it was less than that for cash crops.

Trends in Yields. Both cash crops and feed grains showed initial downward trends from 1910 to 1925 and since then rather strong upward trends (See Fig. 48). The trend in yields of cash crops since 1925 has risen much faster than has yields of feed grains.

The upward movement in yields have been a result of several factors. First, substantially increased applications

of fertilizer since 1934 have been important (Table XXIV).
Secondly, the introduction of new and improved varieties
of seed resistant to disease and lodging raised the average
yields. A third factor was the improved cultural practices
and more adequate machinery which were of assistance in
increasing yields. The erratic annual fluctuations in
yield have been a result of varying climatic conditions
and disease, which adversely affected yields in certain
years.
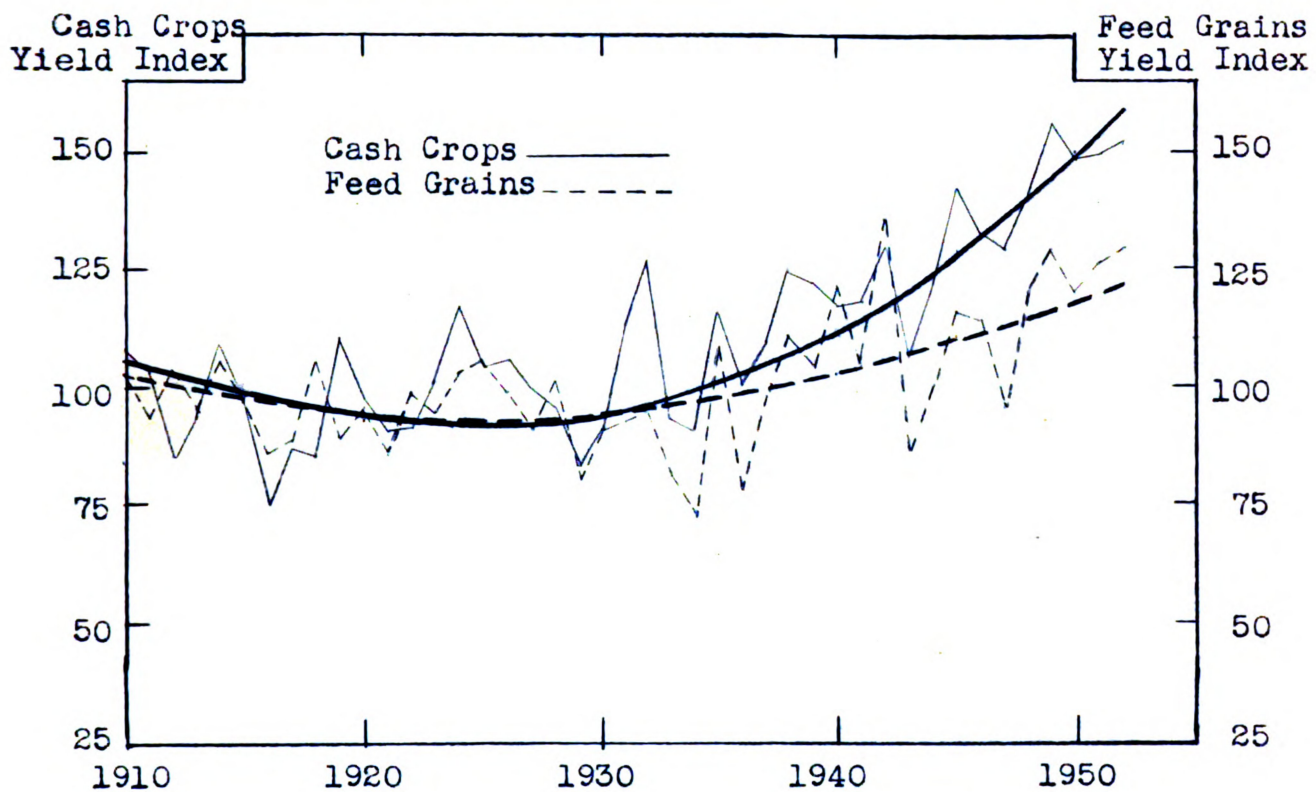
Figure 48. CASH CROPS AND FIELD GRAINS: Trends in Yields,
1910-1952.

Hay and Potatoes[1]

Trends in Acreage. The combined acreage of hay and potatoes has been on a downward trend since 1910, reflecting primarily the lower demands for hay due to reduced livestock numbers (See Fig. 49). If any distinct competition had existed for available land between these two commodities the fluctuations about the trend would have been fairly narrow, indicating that whenever there was a change in acreage of one of these commodities there was a corresponding opposite change in the acreage of the other. On the basis of these assumptions, it is evident that if any competition existed between hay and potatoes for available land, it was disrupted at times making the relation rather irregular.

There was an indication of some competition for available land between 1928 and 1948, when fluctuations about the trend were relatively narrow. During these years whenever there was a fluctuation in hay acreage, there was a corresponding fluctuation in the opposite direction for potatoes. The demand for hay for cattle feed was apparently a major factor causing variations in the acreage of hay. These changes in the acreage of hay seem to have been the determining factors in allocating the available land to hay and potatoes.

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[1]The acreages of hay and potatoes were added together and plotted to determine whether any competition for available land existed between these two commodities.
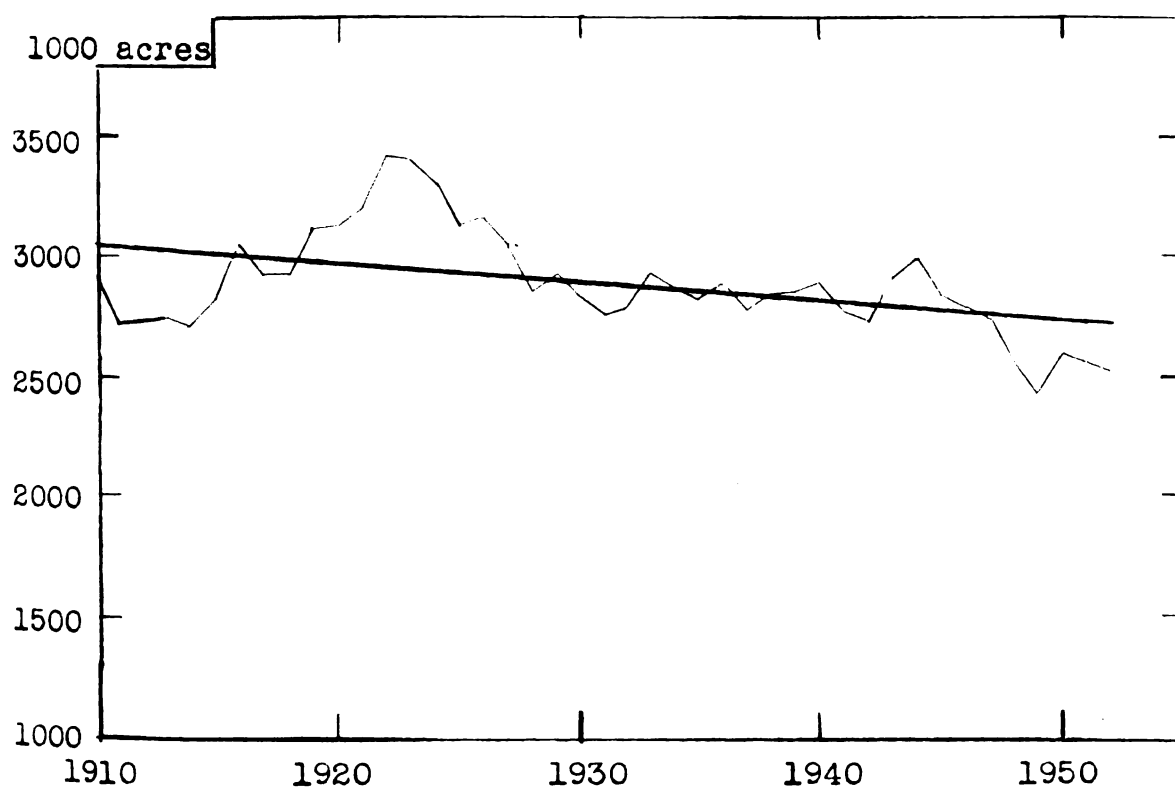
Figure 49.   POTATOES AND HAY: Trends in Combined Acreage,
1910-1952.

Production of Meat Animals in Michigan[1]

Although the production of meat animals in Michigan has trended upward since 1910, the most striking characteristic of this index of production has been its close resemblance to the number of all cattle on Michigan farms (See Fig. 50). The cycle in numbers of all cattle on farms reached major peaks in 1918 and 1944, and a minor peak in 1934. This has been reflected in the production of all meat animals with very little modification due to cycles in hog numbers and cycles in sheep numbers.

The gradual upward trend in the production of meat animals was influenced to a considerable extent by higher purchasing power of consumers. The resulting increased demand for higher quality meats, and, to a lesser extent the government purchases of meat during the war for military purposes, were the most significant factors leading to this upward trend in the production of meat animals.

Production of Poultry Products in Michigan[2]

The production of poultry products in Michigan exhibited a strong upward trend from 1924 to 1952, which culminated

[1]Includes numbers of all cattle, numbers of hogs and numbers of stock sheep on farms in Michigan.

[2]Includes numbers of chickens and the production of eggs in Michigan.
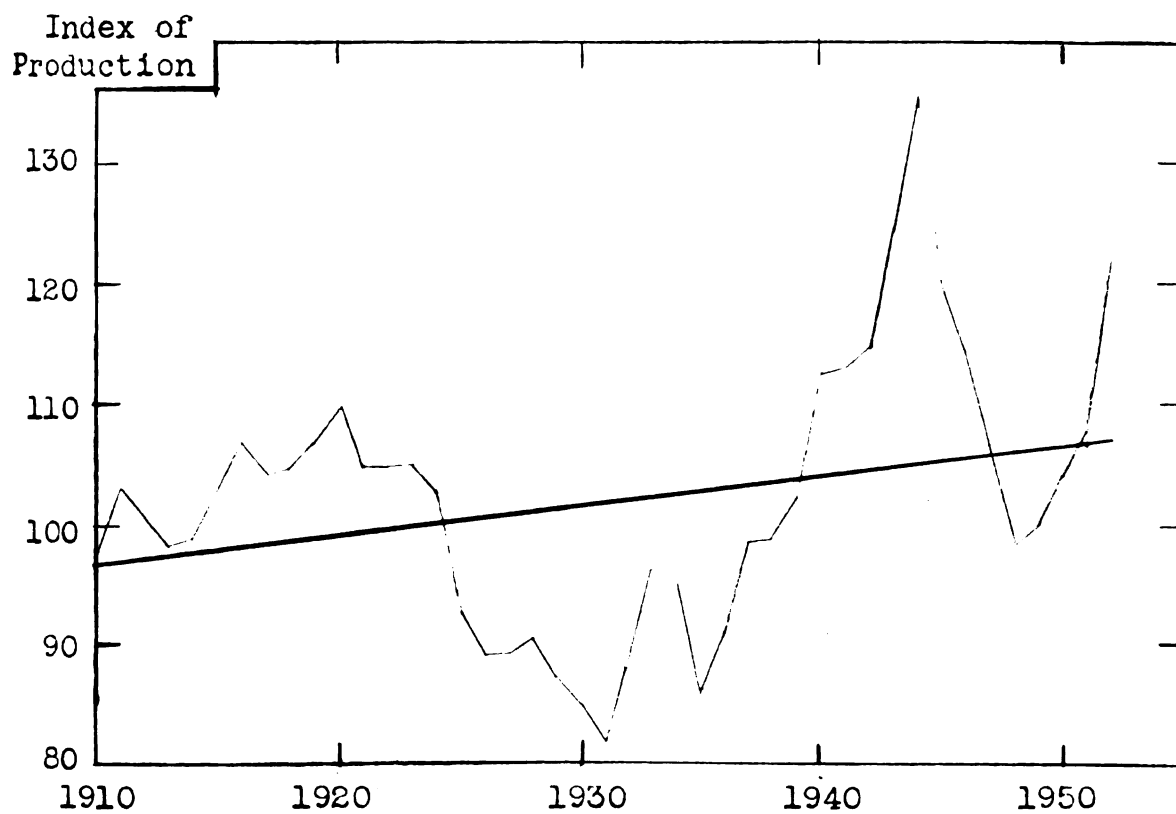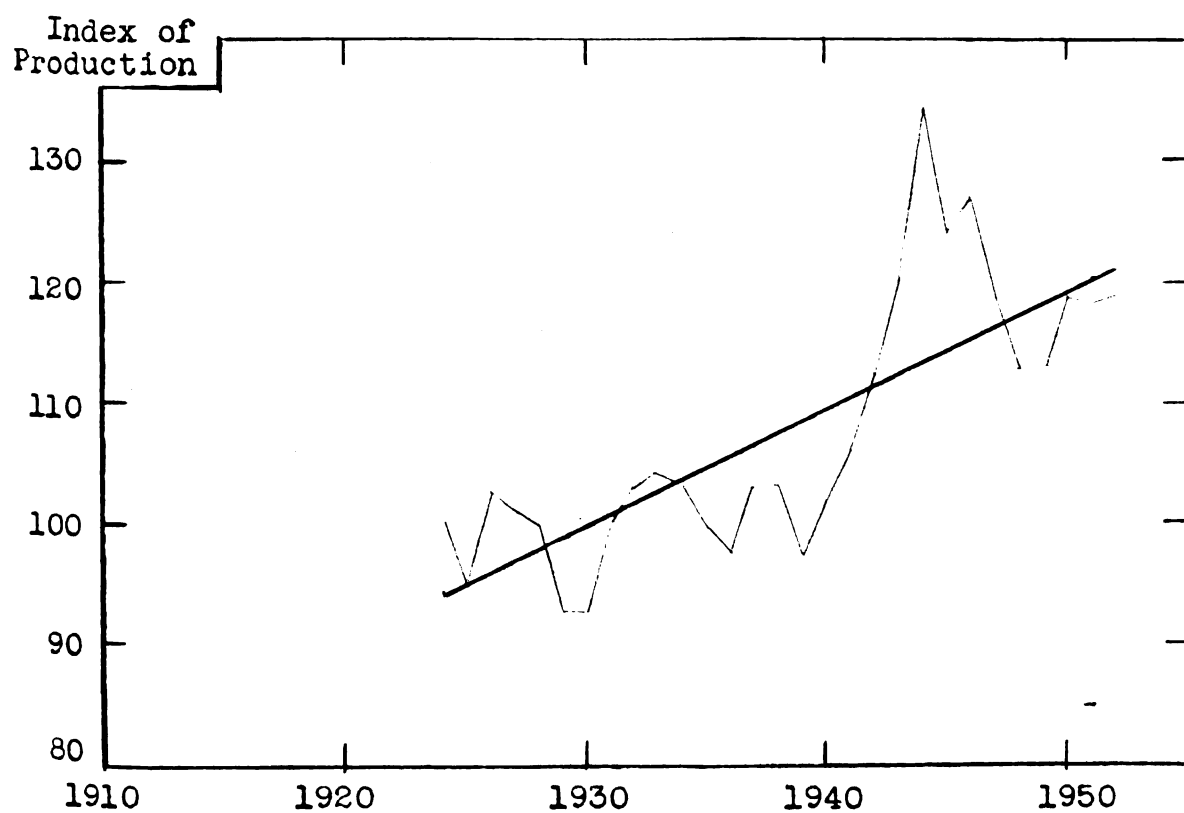
Figure 50.   MEAT ANIMALS: Trends in Production, 1910-1952.

Figure 51.   POULTRY PRODUCTS: Trends in Production,
1924-1952.

Index of
Production

Figure 50.   MEAT ANIMALS: Trends in Production, 1910-1952.

Index of
Production
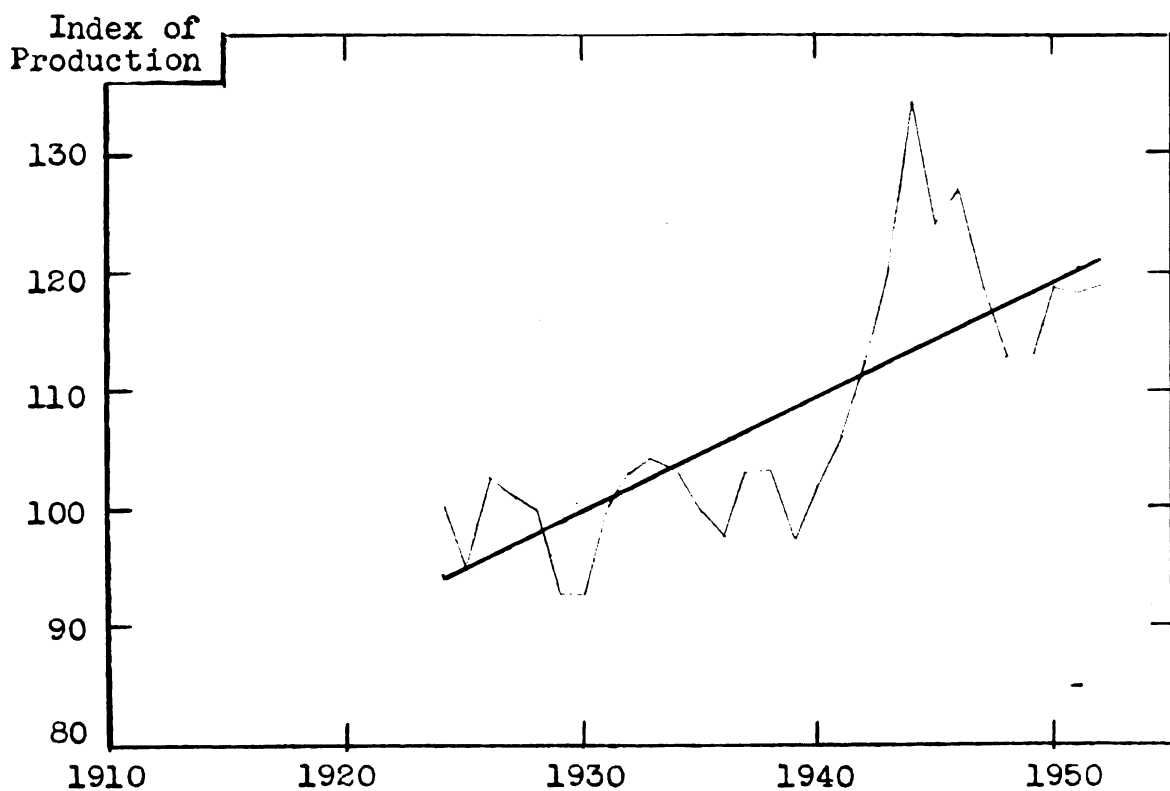
Figure 51.   POULTRY PRODUCTS: Trends in Production,
1924-1952.

in a peak in production in 1944 (See Fig. 51). This
increase in production is a reflection primarily of
heavy demands for eggs from the armed forces during
World War II, and also government purchasing programs
to support the prices of eggs. In supporting prices of
eggs, the government indirectly affected the price of
chickens also, so that on balance the poultry enterprise
has become an increasingly profitable enterprise in
Michigan since 1940. The attractiveness of the poultry
enterprise induced many producers to increase production
of poultry products in recent years. This appears to
have been of considerable importance in causing the
strong upward trend in the production of poultry products.

PART IV

SUMMARY AND CONCLUSIONS

Factors Affecting Price Movements. The trend in
prices of Michigan farm products and the fluctuations
about this trend have been noticeably influenced by
changes in business conditions. Variations in consumer
purchasing power due to this factor altered consumer
demand for these products during the two world wars and
during the depression of the thirties.

Prices have been influenced in recent years by the
price support programs of the government. The first of
a series of Acts passed by Congress having an effect on
prices of farm products was the Agricultural Adjustment
Act of 1933. This legislation was intended to reduce
acreages and thereby production so that the shorter
supply would raise the prices of these products. Of more
importance has been the presently existing price support
program which was to give protection to farmers against
violent price drops during the war and postwar reconversion
period. This plan supported prices at 90 percent of parity
for the basic farm products and any other farm product for
which the Secretary of Agriculture desired an increase in

production. The Agricultural Act of 1949 renewed price
support activities by the United States Department of
Agriculture and introduced additional classifications of
farm products to be supported at varying percentages of
parity. The ultimate effect of these government price
support programs has been to raise the prices of many
farm products.

Another significant factor influencing prices of
farm products has been the annual production in Michigan,
and of still more importance, the total United States
production. The annual variations in production caused
fluctuations in the supply of farm products. These
variations in turn are reflected to a greater or lesser
degree in the prices of farm products, depending on the
elasticity of demand for that product. In addition to
the production of farm products in Michigan and the United
States, production and prices of foreign farm products
have been important in certain cases in explaining price
movements of commodities entering into international trade.

Factors Affecting Production. The production of the
various farm products is influenced to a considerable
extent by the price of that product during the preceding
year. Consequently price has been a major factor influencing
trends and causing cycles of livestock production in Michigan.

In the case of livestock and hogs, the cost of feed and other production cost items relative to the prices obtained from these products were important in influencing production trends and production cycles. When feed costs were high relative to animal prices, the profitability of this enterprise declined, and consequently many producers reduced their livestock numbers. Similarly, when feed costs were low relative to animal prices, the profitability of the enterprise resulted in an increase in numbers and production. These alternating degrees of profitability led to cycles in the numbers of animals on farms.

The trend and variations in acreage of crops planted, which again reflects price, has also influenced production. Acreage has been altered to a certain extent by the acreage control program of the Agricultural Adjustment Act of 1933, and by the acreage allotment program under the Agricultural Act of 1949. Variations in acreage, and also annual fluctuations in yield were of major significance in accounting for trends and fluctuations in Michigan farm crops production.

Factors Affecting Yields. Trends in the yields of Michigan farm products were very noticeably influenced by

the consumption of fertilizer since 1934.[1] The adoption

of new farming techniques and the general improvement in

farming practices undoubtedly resulted in substantial

increases in yield.

The introductions of new and improved varieties of

seed, resistent to disease and lodging, and the practice

of treating seed before planting, have been important in

increasing yields. Similarly, in the case of livestock,

improved breeds of animals have led to a better type of

animal which is capable of greater production. Associated

with this was the increase in the practice of culling poor

producers out, leaving only the strong producers.

In certain years yield was greatly influenced by

climatic conditions. Such uncontrollable factors as late

springs, rains, drought, and frost caused wide annual

fluctuations in yield. The general weather conditions

over a period of years appears to have influenced trend

in yields in certain cases.

General Observations. Michigan farmers have been

producing more cash crops in the past few years. Corn and

oats production have both increased substantially, while

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[1]See Appendix B, Table XXIV.

the production of barley has apparently declined slightly
since 1934. The overall increase in the production of
feed grains appears to have been in response to unusually
high cattle prices and milk prices since 1940, which made
beef farming and dairy farming very profitable in Michigan.

While the production of cash crops increased in recent
years, it was due primarily to upward movements in the
production of winter wheat and field beans. In the case
of winter wheat, high prices due partially to the govern-
ment price support program, were responsible for this
increased production. Other important cash crops such
as potatoes and sugar beets declined in production during
this same period.

Fruit production is becoming a very important source
of farm income in Michigan. Of the fruit grown in Michigan
that was included in this study, peach and pear production
have increased strongly, while the production of apples
increased only very slowly. The increased demand for
fresh fruit, and improved means of maintaining the quality
of fruit while transporting over long distances have
increased demand considerably, and consequently prices.
The profitability of this enterprise prompted many new
producers to start production and old producers to expand
production.

In the case of livestock production in Michigan, there was a strong increase in numbers of all cattle on farms. Although cattle numbers increased rapidly, hog numbers have been increasing only since 1934, and then at a rather slow rate. Stock sheep numbers have been on a steady decline since 1910. Michigan farmers have apparently been rather erratic in sheep production; periodically getting into and out of this enterprise. In the past few years it is evident that they are again getting out of sheep production.

Chicken numbers decreased rapidly while egg production has been on just as rapid an increase. Improved breeds of egg-layers, better feeding practices and management practices probably have been responsible for this greatly increased egg production. Milk production increased in Michigan largely as a result of rapidly rising fluid milk sales, particularly in the Detroit area. The resulting high milk prices, which have been stabilized throughout the year by the base-surplus plan of pricing milk, has been important in increasing production.

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APPENDIX A

THE USE OF ANALYSIS OF VARIANCE IN DETERMINING
WHICH REGRESSION LINE BEST FITS THE DATA[1]

In the study of price, production, and yield of each
of the major Michigan farm products, trend was determined
in each case by fitting two regression lines to the series
of data. One of these lines was a straight line of the
form $Y = a + bX$, and the other was a parabola of the form
$Y = a + bX + cX^2$.[2] The problem then was to determine which
of these two regression lines best fit the series of data.
It was for this purpose that the analysis of variance and
the F test of significance were used.

The analysis of variance as used here compared the
differences in the variances about the two regression
lines.[2] To test the significance of this difference, the
F test was applied to the respective variances that were
explained by the two regression lines. By computing a
ratio of the variance explained by each of these regression
lines to the variance of the residuals, a value of F was
obtained. The values of F obtained for both regression
lines were then tested for significance by comparison
with F tables.

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[1]Snedecor, G. W. Statistical Methods, ed. 4, The Iowa State
College Press, Ames, Iowa, 1946.

[2]Variance is a measure of variation, and it consists of a sum
of squares of deviations from the regression line divided by
the corresponding degrees of freedom. The degrees of freedom
are the number of observations which are free to vary after
certain restrictions are imposed.

Use of Analysis of Variance

The method employed in using the analysis of variance and the F test of significance will be given for winter wheat in Table II.

If the results are to be significant at the 95% level, the value of F must be 4.08. For the parabola about the line the value of F was found to be 10.79. We conclude that the difference that exists between the variance of the parabola and the variance of the line is due to chance in less than 5% of the cases. Therefore the tendency for the relationship to be curvilinear is significant.

TABLE II

WINTER WHEAT: Use of Analysis of Variance in Determining
Which Regression Line Best Fits the Series of Data

	Degrees of Freedom[a]	Sum of Squares of Deviations	Variance[f]	Computed F
Residuals	39	[b] 8.36	.241	
Parabola about the line	1	[c] 2.31	2.31	[g]10.79
Line about the mean	1	[d] .71	.71	[h] 3.32
Total	41	[e]11.38		

[a]Total degrees of freedom is $N - 1$.

[b]Sum of squares of deviations about the parabola, i.e. sum of squares of the residual deviations is

$$\sum(Y-Y'')^2 = \sum Y^2 - a\sum Y - b\sum XY - c\sum X^2 Y.$$

[c]Sum of squares of deviations of the parabola about the line

$$= \sum(Y''-Y')^2$$

$$= \sum(Y-Y')^2 - \sum(Y-Y'')^2$$

$$= \left[\frac{(\sum Y)^2}{n} - b_L(\sum XY - \frac{\sum X \sum Y}{n})\right] - \left[\sum Y^2 - a\sum Y - b\sum XY - c\sum X^2 Y\right]$$

[d]Sum of squares of deviations of the line about the mean

$$= \sum(Y'-\bar{Y})^2$$

$$= \sum(Y-\bar{Y})^2 - \left[\sum(Y-Y'')^2 + \sum(Y''-Y')^2\right]$$

[e]Total sum of squares $= \sum(Y-\bar{Y})^2$

$$= \sum Y^2 - \frac{(\sum Y)^2}{n}$$

[f]Variance $= \dfrac{\text{Sum of squares of deviations}}{\text{Degrees of freedom}}$

[g]Computed F for parabola about the line

$\quad = \dfrac{\text{Variance of parabola about the line}}{\text{Residual variance}}$

[h]Computed F for line about the mean

$\quad = \dfrac{\text{Variance of line about the mean}}{\text{Residual variance}}$

APPENDIX B

Supplementary Tables

TABLE III

CORN: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Bushel	Purchasing Power[a] 1910-14=100	Production	Yield Per Acre
	dollars	percent	100,000 bushels	bushels
1910	.54	89	544	32.0
1911	.67	108	544	32.0
1912	.58	90	540	33.0
1913	.68	104	539	32.0
1914	.72	109	613	35.0
1915	.73	109	543	31.0
1916	1.20	161	446	27.0
1917	1.74	184	376	21.5
1918	1.53	138	462	28.0
1919	1.57	125	602	34.5
1920	.72	53	668	37.5
1921	.60	61	654	37.5
1922	.77	80	573	33.5
1923	.86	84	522	32.5
1924	1.17	114	414	26.5
1925	.72	78	589	38.5
1926	.81	80	480	33.0
1927	.96	94	325	26.0
1928	.93	89	399	31.0
1929	.90	88	299	25.0
1930	.70	72	282	22.0
1931	.37	45	438	29.0
1932	.40	56	540	35.0
1933	.55	80	468	31.0
1934	.81	106	365	23.0
1935	.63	80	617	37.0
1936	1.06	134	383	25.5
1937	.55	66	557	35.0
1938	.48	61	588	37.0
1939	.57	72	599	37.5
1940	.68	86	516	33.0
1941	.81	95	488	32.5
1942	.96	98	697	43.0
1943	1.17	108	529	34.0
1944	1.15	98	578	32.0
1945	1.31	108	619	35.0
1946	1.70	128	505	28.0

TABLE III (Continued)

Year	Price Per Bushel	Purchasing Power[a] 1910-14=100	Production	Yield Per Acre
	dollars	percent	100,000 bushels	bushels
1947	2.21	144	447	27.5
1948	1.30	78	671	39.0
1949	1.26	78	859	48.0
1950	1.60	98	610	38.5
1951	1.75	97	691	41.5
1952	1.55	84	832	50.5

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE IV

OATS: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 100,000 bushels	Yield Per Acre bushels
1910	.36	91	500	33.0
1911	.45	113	443	29.5
1912	.36	88	520	35.0
1913	.40	98	443	29.5
1914	.46	110	508	33.5
1915	.40	93	612	40.0
1916	.53	112	427	30.0
1917	.74	122	566	36.5
1918	.67	95	653	39.4
1919	.82	102	373	24.4
1920	.51	59	617	39.5
1921	.37	59	295	18.5
1922	.41	66	464	31.0
1923	.44	68	451	29.5
1924	.50	76	596	39.8
1925	.41	61	493	30.5
1926	.42	63	466	31.0
1927	.52	81	491	32.0
1928	.44	66	514	33.5
1929	.47	71	355	28.0
1930	.35	56	484	35.0
1931	.23	44	456	30.5
1932	.20	44	383	27.0
1933	.38	85	272	22.5
1934	.49	100	318	24.0
1935	.26	51	471	33.0
1936	.47	93	332	25.5
1937	.35	66	353	28.0
1938	.29	56	435	34.5
1939	.34	68	427	36.4
1940	.32	63	614	45.5
1941	.46	85	459	34.0
1942	.51	83	674	45.0
1943	.84	120	239	21.0
1944	.74	100	431	32.9
1945	.71	93	602	40.0
1946	.81	95	719	45.5

TABLE IV (Continued)

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 100,000 bushels	Yield Per Acre bushels
1947	1.12	115	382	35.0
1948	.73	68	567	38.5
1949	.68	66	567	36.0
1950	.82	78	545	38.5
1951	.85	73	602	40.5
1952	.84	71	508	33.5

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE V

BARLEY: Prices, Production and Yields,
Michigan, 1910-1952

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 bushels	Yield Per Acre bushels
1910	.63	97	233	25.0
1911	.81	124	194	21.5
1912	.62	91	213	24.5
1913	.61	90	196	23.0
1914	.68	98	225	25.0
1915	.67	96	231	26.5
1916	.88	113	264	22.0
1917	1.39	140	429	26.0
1918	1.03	90	840	28.0
1919	1.24	94	489	16.2
1920	.92	64	617	25.5
1921	.54	52	327	15.0
1922	.63	63	322	23.0
1923	.66	63	269	21.0
1924	.83	78	338	29.4
1925	.69	63	290	22.5
1926	.64	60	352	26.5
1927	.79	75	482	26.5
1928	.71	66	752	28.5
1929	.70	66	438	19.4
1930	.54	54	635	27.5
1931	.39	45	697	26.0
1932	.32	43	621	20.5
1933	.52	72	319	13.5
1934	.71	88	356	20.2
1935	.48	58	518	27.0
1936	.93	112	372	20.0
1937	.59	67	483	23.0
1938	.48	58	504	28.5
1939	.47	57	649	30.2
1940	.45	54	653	34.0
1941	.63	72	652	31.5
1942	.79	78	729	33.0
1943	1.19	105	256	16.5
1944	1.23	102	358	25.6
1945	1.18	93	366	31.0
1946	1.47	106	504	36.5

TABLE V (Continued)

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 bushels	Yield Per Acre bushels
1947	1.93	119	345	30.0
1948	1.33	76	448	32.0
1949	1.03	61	356	28.5
1950	1.20	70	391	34.0
1951	1.20	64	388	34.0
1952	1.20	63	255	29.0

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE VI

RYE: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000 bushels	Yield Per Acre bushels
1910	.70	100	5764	13.5
1911	.81	114	5400	13.5
1912	.66	90	4440	12.0
1913	.60	82	4940	13.0
1914	.84	114	5036	13.5
1915	.85	113	5400	13.5
1916	1.16	139	5125	12.5
1917	1.17	110	6020	14.0
1918	1.51	121	7420	14.0
1919	1.42	100	12143	13.3
1920	1.48	96	9937	14.7
1921	.86	78	8112	12.5
1922	.71	65	7776	12.0
1923	.60	53	5135	13.0
1924	.98	85	3350	14.5
1925	.85	72	2312	11.5
1926	.80	69	1932	12.5
1927	.89	78	2132	13.0
1928	.92	79	1920	11.5
1929	.88	76	1632	11.1
1930	.56	51	1911	13.0
1931	.33	35	2187	13.5
1932	.30	38	2100	12.5
1933	.58	74	1376	10.5
1934	.65	75	1382	8.8
1935	.42	47	3078	13.5
1936	.84	94	1495	11.5
1937	.77	82	1530	11.5
1938	.42	47	1404	13.5
1939	.47	53	1313	13.0
1940	.43	49	1160	14.5
1941	.64	68	756	13.5
1942	.67	61	1088	14.5
1943	1.03	85	667	11.5
1944	1.07	82	787	12.7
1945	1.38	101	840	15.0
1946	1.84	124	672	14.0

TABLE VI (Continued)

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000 bushels	Yield Per Acre bushels
1947	2.25	131	1120	16.0
1948	1.45	78	1280	16.0
1949	1.21	67	930	15.5
1950	1.27	69	870	14.5
1951	1.55	76	868	14.0
1952	1.80	87	630	14.0

Source: Reports of State Agricultural Statistician,
Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price
using the index of prices paid by farmers in United States.

TABLE VII

WINTER WHEAT: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 bushels	Yield Per Acre bushels
1910	.90	96	1767	19.0
1911	.88	94	1836	18.0
1912	1.00	103	735	10.5
1913	.89	92	1360	16.0
1914	1.13	115	1820	20.0
1915	1.05	104	2071	20.5
1916	1.61	145	1394	17.0
1917	2.06	145	1562	18.0
1918	2.11	127	994	14.0
1919	2.20	117	1922	20.3
1920	1.85	90	1551	15.6
1921	1.11	75	1448	16.0
1922	1.10	76	1521	15.0
1923	.97	64	1579	17.5
1924	1.42	93	1875	23.8
1925	1.58	100	1353	17.0
1926	1.21	79	1650	18.5
1927	1.27	83	1707	21.5
1928	1.26	81	1284	16.5
1929	1.12	73	1357	17.4
1930	.75	52	1633	23.0
1931	.46	37	1864	26.0
1932	.45	42	1704	24.0
1933	.80	76	1419	16.5
1934	.88	76	1189	14.2
1935	.79	67	1879	22.0
1936	1.07	90	1646	20.5
1937	.95	76	1843	18.5
1938	.59	50	1926	21.5
1939	.76	65	1572	21.5
1940	.77	65	1805	23.5
1941	1.02	80	1606	22.0
1942	1.24	85	1512	22.5
1943	1.56	96	1131	17.0
1944	1.52	88	2322	24.6
1945	1.59	88	2701	27.5
1946	2.05	103	2290	26.5

TABLE VII (Continued)

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 bushels	Yield Per Acre bushels
1947	2.41	104	2980	25.0
1948	2.07	83	3627	26.0
1949	1.83	76	3502	27.0
1950	2.01	82	2967	26.0
1951	2.20	81	3080	25.0
1952	2.00	73	3640	25.5

Source: Reports of State Agricultural Statistician,
Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE VIII

BUCKWHEAT: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000 bushels	Yield Per Acre bushels
1910	.64	96	936	13.0
1911	.72	106	904	13.5
1912	.66	94	928	14.5
1913	.70	100	780	13.0
1914	.74	104	826	14.5
1915	.75	103	660	12.0
1916	1.17	146	720	12.0
1917	1.59	155	825	11.0
1918	1.56	130	855	9.0
1919	1.52	112	517	12.6
1920	1.12	75	691	14.1
1921	.77	73	660	15.0
1922	.83	80	744	12.0
1923	.89	81	575	12.5
1924	1.05	96	665	13.3
1925	.84	74	650	12.5
1926	.78	71	559	13.0
1927	.83	75	483	11.5
1928	.81	73	513	13.5
1929	.85	77	338	9.4
1930	.80	77	142	7.5
1931	.45	51	200	10.0
1932	.37	48	290	14.5
1933	.50	67	275	11.0
1934	.57	70	212	12.5
1935	.47	55	495	15.0
1936	.84	99	250	12.5
1937	.62	68	300	15.0
1938	.48	57	360	15.0
1939	.52	61	375	15.0
1940	.46	54	442	17.0
1941	.65	71	232	14.5
1942	.87	83	391	17.0
1943	1.17	100	800	16.0
1944	.94	75	512	15.5
1945	1.12	86	350	14.0
1946	1.46	103	243	13.5

TABLE VIII (Continued)

Year	Price Per Bushel	Purchasing Power[a] 1910-14=100	Production	Yield Per Acre
	dollars	percent	1,000 bushels	bushels
1947	1.91	116	741	13.0
1948	1.11	62	351	13.0
1949	.88	51	276	14.5
1950	1.02	58	264	15.5
1951	1.30	67	210	15.0
1952	1.45	74	204	17.0

Source: Reports of State Agricultural Statistician,
         Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price
using the index of prices paid by farmers in United States.

TABLE IX

ALL HAY: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Ton dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 tons	Yield Per Acre tons
1910	13.60	103	312	1.20
1911	18.00	134	284	1.15
1912	11.70	85	314	1.25
1913	12.60	91	264	1.05
1914	12.20	87	320	1.25
1915	12.50	87	298	1.15
1916	10.90	69	421	1.45
1917	17.70	88	346	1.25
1918	23.20	98	280	1.00
1919	25.30	94	311	1.11
1920	17.10	59	312	1.12
1921	13.50	64	255	.91
1922	10.10	49	377	1.33
1923	14.50	67	325	1.15
1924	11.20	51	353	1.21
1925	16.40	73	217	.82
1926	13.30	61	297	1.10
1927	10.00	46	344	1.23
1928	11.00	50	316	1.22
1929	10.00	46	348	1.29
1930	13.90	67	256	.98
1931	7.80	44	268	1.07
1932	5.40	35	315	1.26
1933	8.10	54	315	1.20
1934	16.90	103	202	.79
1935	6.00	35	363	1.45
1936	9.80	58	300	1.14
1937	7.90	44	345	1.37
1938	6.30	37	364	1.39
1939	7.60	45	347	1.31
1940	6.50	38	406	1.50
1941	12.00	67	331	1.26
1942	10.50	51	398	1.52
1943	14.80	64	403	1.42
1944	18.50	75	390	1.38
1945	15.70	61	425	1.49
1946	17.30	61	346	1.24

TABLE IX (Continued)

Year	Price Per Ton dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 tons	Yield Per Acre tons
1947	18.90	58	373	1.32
1948	21.40	61	361	1.37
1949	20.50	60	336	1.32
1950	20.70	59	349	1.39
1951	20.00	52	388	1.54
1952	21.50	55	354	1.44

Source: Reports of State Agricultural Statistician,
         Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price
using the index of prices paid by farmers in United States.

TABLE X

POTATOES: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 100,000 bushels	Yield Per Acre bushels
1910	.37	75	353	105
1911	.84	169	304	97
1912	.40	78	333	112
1913	.56	111	268	93
1914	.34	66	343	119
1915	.70	131	175	62
1916	1.94	328	119	44
1917	.88	118	330	103
1918	1.02	116	253	88
1919	2.00	200	242	86
1920	.66	61	337	109
1921	1.04	131	249	76
1922	.44	57	364	106
1923	.59	73	321	110
1924	.45	55	306	125
1925	1.64	196	227	102
1926	1.11	135	257	121
1927	.91	112	221	84
1928	.36	43	314	116
1929	1.34	165	160	71
1930	.89	116	146	63
1931	.32	49	246	92
1932	.27	47	303	104
1933	.75	135	233	75
1934	.29	47	362	112
1935	.55	86	276	87
1936	1.02	161	250	95
1937	.49	73	250	96
1938	.48	77	255	115
1939	.67	108	210	94
1940	.57	90	175	82
1941	.85	126	200	110
1942	1.25	161	166	98
1943	1.33	153	224	105
1944	1.59	171	188	108
1945	1.37	143	180	110
1946	1.22	116	183	123

TABLE X (Continued)

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 100,000 bushels	Yield Per Acre bushels
1947	1.72	141	124	105
1948	1.40	106	164	150
1949	1.25	98	172	165
1950	1.98	151	153	180
1951	1.80	126	108	180
1952	2.60	178	104	185

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XI

FIELD BEANS: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Cwt. dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 cwt.	Yield Per Acre pounds
1910	2.95	93	315	750
1911	3.45	108	342	720
1912	3.20	97	400	780
1913	2.85	86	352	690
1914	3.90	116	329	672
1915	5.50	160	255	504
1916	10.50	277	186	396
1917	11.40	238	219	408
1918	7.60	134	270	540
1919	6.70	104	261	828
1920	3.50	50	263	786
1921	4.55	90	220	702
1922	6.10	124	302	660
1923	4.80	92	386	720
1924	5.20	99	413	660
1925	4.15	77	527	810
1926	4.35	83	459	720
1927	5.90	114	306	540
1928	8.00	151	344	660
1929	6.70	128	322	560
1930	4.35	88	290	420
1931	1.80	43	356	560
1932	1.50	41	508	920
1933	2.25	63	414	730
1934	2.75	70	418	661
1935	2.25	56	472	890
1936	6.00	148	274	570
1937	2.55	60	410	910
1938	1.85	46	457	980
1939	2.80	70	486	988
1940	3.50	86	433	760
1941	4.55	106	527	770
1942	4.80	97	528	1030
1943	5.90	106	537	870
1944	6.00	101	455	690
1945	6.20	100	298	820
1946	9.60	142	384	740

TABLE XI (Continued)

Year	Price Per Cwt. dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 cwt.	Yield Per Acre pounds
1947	12.40	158	313	670
1948	7.20	85	444	880
1949	5.90	72	571	1100
1950	6.70	80	399	950
1951	6.60	72	423	1120
1952	7.50	80	391	1150

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XII

SUGAR BEETS: Prices, Production, and Yields,
Michigan, 1910-1952

Year	Price Per Ton dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000 tons	Yield Per Acre tons
1910	6.00	108	1208	10.3
1911	5.74	103	1444	9.9
1912	5.69	99	839	6.8
1913	5.93	102	955	9.0
1914	5.23	88	857	8.5
1915	5.91	98	998	8.2
1916	6.14	92	544	5.5
1917	8.04	95	525	6.4
1918	10.08	102	890	7.9
1919	12.52	111	1205	9.8
1920	10.09	82	1320	8.8
1921	6.10	69	1153	7.8
1922	7.24	84	692	8.2
1923	9.38	103	818	8.1
1924	8.88	97	966	7.2
1925	7.05	75	969	9.8
1926	7.00	76	793	7.9
1927	7.16	79	703	7.1
1928	7.22	78	452	6.4
1929	7.94	87	300	5.8
1930	8.08	93	513	6.9
1931	6.33	85	581	10.0
1932	5.73	89	1215	10.0
1933	5.81	93	1203	7.8
1934	5.92	86	999	8.5
1935	6.29	89	686	6.0
1936	6.45	91	867	8.8
1937	6.17	82	549	7.2
1938	6.08	86	1005	8.2
1939	5.59	79	1033	8.6
1940	6.34	89	1022	9.1
1941	7.43	98	1016	10.8
1942	7.49	86	1098	9.8
1943	10.20	105	298	6.2
1944	12.10	116	519	8.8
1945	11.10	102	627	8.0
1946	13.80	116	814	8.6

TABLE XII (Continued)

Year	Price Per Ton dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000 tons	Yield Per Acre tons
1947	13.30	97	446	6.8
1948	13.50	91	458	8.8
1949	11.60	81	743	9.6
1950	11.70	80	1020	10.4
1951	11.90	74	589	10.9
1952	12.70	77	524	10.7

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XIII

PEARS: Prices and Production,
Michigan, 1910-1952

Year	Price Per Bushel	Purchasing Power[a] 1910-14=100	Production
	dollars	percent	1,000 bushels
1910	.95	130	450
1911	.60	80	786
1912	.75	96	486
1913	.92	120	597
1914	.58	74	660
1915	.72	91	388
1916	.65	74	559
1917	1.21	108	490
1918	1.25	95	435
1919	1.80	120	405
1920	.90	55	679
1921	1.75	149	386
1922	.80	70	721
1923	1.07	88	441
1924	1.10	91	535
1925	1.15	92	396
1926	.80	66	701
1927	1.25	104	564
1928	.95	78	723
1929	1.35	111	400
1930	1.05	92	844
1931	.65	66	689
1932	.45	53	1087
1933	.80	96	812
1934	.65	71	1246
1935	.70	75	1118
1936	.75	82	1295
1937	.70	70	1242
1938	.75	80	1201
1939	.65	70	1119
1940	.80	86	1158
1941	.85	84	1284
1942	1.30	113	1000
1943	2.85	221	378
1944	1.90	137	938
1945	2.50	174	140
1946	2.35	150	696

TABLE XIII (Continued)

Year	Price Per Bushel	Purchasing Power[a] 1910-14=100	Production
	dollars	percent	1,000 bushels
1947	2.15	118	650
1948	2.35	120	300
1949	1.30	68	1200
1950	1.80	92	812
1951	1.95	91	1035
1952	1.60	74	1036

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XIV

PEACHES: Prices and Production,
Michigan, 1910-1952

Year	Price Per Bushel	Purchasing Power[a] 1910-14=100	Production
	dollars	percent	1,000 bushels
1910	1.39	102	1170
1911	1.11	81	2057
1912	1.65	116	618
1913	1.50	106	1291
1914	1.40	95	989
1915	.97	66	1760
1916	1.24	76	1387
1917	2.00	96	468
1918	3.30	136	148
1919	3.10	112	448
1920	2.30	77	1177
1921	2.90	134	389
1922	1.50	71	1091
1923	1.75	79	834
1924	2.30	103	383
1925	2.65	116	483
1926	1.00	45	1334
1927	2.10	94	615
1928	1.55	69	1235
1929	1.80	81	998
1930	1.50	71	999
1931	.60	33	2295
1932	.70	45	2123
1933	1.75	115	251
1934	1.75	104	644
1935	.85	49	2602
1936	1.50	86	1894
1937	.95	52	3052
1938	1.30	75	1625
1939	.70	41	3488
1940	1.05	61	2280
1941	.80	44	4094
1942	2.00	94	2300
1943	4.15	174	1650
1944	2.40	94	4500
1945	2.00	76	5100
1946	2.00	69	5100

TABLE XIV (Continued)

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000 bushels
1947	1.80	54	4300
1948	1.90	52	3250
1949	1.20	34	3500
1950	1.70	47	4800
1951	3.00	76	728
1952	1.75	44	3397

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XV

APPLES: Prices and Production,
Michigan, 1910-1952

Year	Price Per Bushel	Purchasing Power[a] 1910-14=100	Production[b] 1910-14=100
	dollars	percent	percent
1910	.88	149	37.3
1911	.57	95	107.7
1912	.49	80	145.2
1913	.62	100	72.6
1914	.47	76	137.2
1915	.63	98	73.1
1916	.77	108	94.1
1917	1.12	125	37.8
1918	.97	92	98.9
1919	1.59	133	52.0
1920	.84	64	134.2
1921	1.64	174	45.3
1922	.85	92	94.4
1923	1.00	103	88.4
1924	1.12	115	47.7
1925	.98	98	74.7
1926	.78	80	77.8
1927	1.40	144	36.5
1928	1.12	113	46.6
1929	1.34	138	63.7
1930	.99	108	53.5
1931	.54	69	98.0
1932	.65	95	57.4
1933	.70	105	88.5
1934	.84	115	64.2
1935	.64	85	85.7
1936	.99	131	70.0
1937	.56	71	110.2
1938	.86	113	58.4
1939	.53	71	117.4
1940	.87	115	67.2
1941	.83	103	85.4
1942	1.19	128	98.6
1943	2.33	225	62.9
1944	2.14	194	77.9
1945	3.38	293	13.3
1946	2.10	167	80.7

TABLE XV (Continued)

Year	Price Per Bushel dollars	Purchasing Power[a] 1910-14=100 percent	Production[b] 1910-14=100 percent
1947	1.35	92	68.3
1948	2.20	139	51.6
1949	1.05	69	125.3
1950	1.40	90	74.9
1951	1.40	82	97.0
1952	2.10	185	90.1

Source: Reports of State Agricultural Statistician,
Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price
using the index of prices paid by farmers in United States.

[b]An index of production was used because of the nature of
the data. Prior to 1938 total production was reported
and after 1934 only commercial production was reported.
The index was linked on the period 1934-38 and based
upon commercial production beginning with 1934.

TABLE XVI

CATTLE, HOGS, SHEEP, AND MILK COWS:
Numbers on Michigan Farms, 1910-1952

Year	No. of all Cattle on Farms	No. of Hogs on Farms	No. of Stock Sheep on Farms	No. of Milk Cows on Farms
	1,000	1,000	1,000	1,000
1910	1322	931	1714	740
1911	1320	1060	1885	766
1912	1295	1050	1696	780
1913	1318	1000	1442	782
1914	1370	1000	1197	785
1915	1448	1060	1053	810
1916	1501	1115	1000	820
1917	1531	1025	900	840
1918	1582	975	944	850
1919	1584	1035	970	818
1920	1586	1106	960	824
1921	1536	1060	778	815
1922	1506	1100	752	823
1923	1460	1150	775	831
1924	1420	1143	745	847
1925	1406	855	830	850
1926	1350	820	870	800
1927	1320	845	950	784
1928	1313	862	1020	775
1929	1335	759	1040	785
1930	1391	630	1025	800
1931	1391	542	1025	832
1932	1433	661	1035	864
1933	1516	793	1035	888
1934	1544	730	1025	912
1935	1518	512	1015	905
1936	1548	620	995	887
1937	1594	775	975	896
1938	1626	752	924	905
1939	1675	812	885	923
1940	1725	1039	885	941
1941	1811	977	850	969
1942	1847	987	790	988
1943	1921	1184	758	1018
1944	2036	1397	675	1059
1945	2016	978	574	1080
1946	1915	949	488	1058

TABLE XVI (Continued)

Year	No. of all Cattle on Farms	No. of Hogs on Farms	No. of Stock Sheep on Farms	No. of Milk Cows on Farms
	1,000	1,000	1,000	1,000
1947	1838	835	415	1026
1928	1746	716	403	964
1949	1746	759	343	945
1950	1781	835	336	945
1951	1817	902	343	945
1952	1872	956	353	926

Source: Reports of State Agricultural Statistician,
Lansing, Michigan

TABLE XVII

BEEF CATTLE, VEAL CALVES, AND HOGS:
Prices and Purchasing Power Indices,
Michigan, 1910-1952

	Beef Cattle		Veal Calves		Hogs	
Year	Price Per Cwt.	Purchasing Power[a] 1910-14=100	Price Per Cwt.	Purchasing Power[a] 1910-14=100	Price Per Cwt.	Purchasing Power[a] 1910-14=100
	dollars	percent	dollars	percent	dollars	percent
1910	4.79	93	7.02	98	8.48	118
1911	4.47	86	6.50	90	6.27	87
1912	5.03	94	6.87	92	6.75	91
1913	5.97	111	8.17	110	7.77	104
1914	6.41	116	8.33	110	7.64	100
1915	6.00	107	8.02	104	6.52	84
1916	6.31	102	8.80	103	8.32	97
1917	7.76	98	11.23	103	13.77	126
1918	8.86	96	13.32	104	15.81	124
1919	9.32	89	15.01	103	16.59	114
1920	8.52	75	14.02	89	13.42	85
1921	5.85	71	9.46	83	8.07	71
1922	5.71	71	9.26	83	8.88	80
1923	5.98	71	9.83	84	7.43	63
1924	5.68	67	10.10	86	7.57	64
1925	6.28	72	10.99	91	11.15	92
1926	6.71	79	12.02	102	12.02	102
1927	7.29	86	12.59	107	10.05	86
1928	9.33	108	14.19	119	9.19	77
1929	9.24	109	14.44	123	9.89	84
1930	7.31	91	11.46	103	9.14	82
1931	5.18	75	8.28	86	6.26	65
1932	3.93	66	5.76	70	3.73	45
1933	3.56	61	5.38	67	3.70	46
1934	3.63	57	5.74	65	4.44	50
1935	6.05	92	8.79	96	8.95	98
1936	5.52	84	8.87	97	9.52	104
1937	6.90	99	9.79	101	9.97	103
1938	6.43	98	9.63	105	8.03	88
1939	6.94	107	9.79	109	6.68	74
1940	7.15	108	10.33	113	5.62	61
1941	8.16	116	11.71	120	9.28	95
1942	10.10	126	14.22	128	13.60	122
1943	11.41	126	15.18	121	13.97	111
1944	10.75	111	14.61	109	13.17	98

TABLE XVII (Continued)

	Beef Cattle		Veal Calves		Hogs	
Year	Price Per Cwt.	Purchasing Power[a] 1910-14=100	Price Per Cwt.	Purchasing Power[a] 1910-14=100	Price Per Cwt.	Purchasing Power[a] 1910-14=100
	dollars	percent	dollars	percent	dollars	percent
1945	12.32	123	14.92	107	14.19	102
1946	15.29	139	16.56	109	17.40	114
1947	18.78	148	24.09	137	24.29	137
1948	21.86	159	28.30	148	23.53	123
1949	20.02	151	27.67	150	18.68	101
1950	22.02	162	28.78	153	18.36	97
1951	27.59	184	35.13	169	20.57	99
1952	24.40	160	31.40	149	18.10	86

Source: Reports of State Agricultural Statistician,
          Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price
using the index of prices paid by farmers in United States.

TABLE XVIII

SHEEP, LAMBS, AND WOOL: Prices and Purchasing Power Indices, and Production of Wool, Michigan, 1910-1952

| | Sheep | | Lambs | | Wool | | |
Year	Price Per Cwt. dollars	Purchasing Power 1910-14=100 percent	Price Per Cwt. dollars	Purchasing Power 1910-14=100 percent	Price Per Lb. dollars	Purchasing Power 1910-14=100 percent	Production 1,000 lbs.
1910	4.97	118	6.71	110	.24	119	11,475
1911	3.72	88	5.26	85	.19	91	14,090
1912	3.93	90	5.92	94	.21	101	10,125
1913	4.46	102	6.69	106	.19	92	8,400
1914	4.58	102	6.75	105	.21	97	8,098
1915	4.74	104	7.27	111	.27	124	8,075
1916	5.87	117	8.71	120	.33	133	8,275
1917	8.38	130	12.60	136	.55	176	8,192
1918	9.84	131	14.38	133	.65	181	8,765
1919	8.98	105	13.79	112	.59	143	7,836
1920	7.71	83	12.87	96	.44	100	7,020
1921	4.12	61	7.96	82	.20	62	6,346
1922	5.63	86	10.96	116	.33	105	6,256
1923	6.08	88	11.48	115	.41	124	6,478
1924	7.13	103	11.49	115	.40	119	6,880
1925	6.50	91	12.91	126	.42	124	7,416
1926	6.42	92	12.42	124	.37	110	7,600
1927	5.92	86	12.26	123	.35	105	8,446
1928	6.37	91	12.98	128	.42	124	8,774
1929	6.28	91	12.93	129	.36	110	8,480
1930	4.33	66	8.88	94	.23	71	8,400
1931	2.87	51	6.75	83	.15	57	8,526
1932	2.16	44	5.09	73	.10	43	8,282
1933	2.10	44	5.41	79	.19	81	7,840
1934	2.47	47	6.59	88	.25	100	8,424

TABLE XVIII (Continued)

Year	Sheep		Lambs		Wool		
	Price Per Cwt. dollars	Purchasing Power[a] 1910-14=100 percent	Price Per Cwt. dollars	Purchasing Power[a] 1910-14=100 percent	Price Per Lbs. dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000 lbs.
1935	3.44	64	7.96	103	.22	86	8,405
1936	3.45	64	8.87	114	.30	114	7,940
1937	4.19	74	9.67	118	.33	119	8,077
1938	3.30	61	7.58	98	.21	81	7,348
1939	3.27	62	8.30	109	.26	100	7,152
1940	3.39	63	8.82	114	.33	129	7,314
1941	4.18	73	10.08	122	.40	143	6,849
1942	5.36	82	12.42	131	.42	133	6,448
1943	6.62	90	13.62	128	.45	181	5,975
1944	5.55	70	13.56	119	.44	114	5,265
1945	5.67	69	14.04	119	.45	114	4,535
1946	6.78	76	16.56	128	.46	105	3,912
1947	7.73	74	21.33	142	.44	86	3,403
1948	9.03	80	23.07	142	.45	81	3,264
1949	9.51	88	23.43	150	.46	86	2,744
1950	10.18	92	25.10	157	.50	95	2,688
1951	14.38	118	30.96	175	.83	138	2,813
1952	9.90	80	25.20	141	.50	81	2,895

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XIX

CHICKENS AND EGGS: Prices and Production,
Michigan, 1910-1952

	Chickens			Eggs		
Year	Price Per Lb. cents	Purchasing Power[a] 1910-14=100 percent	Numbers on Farms 100,000	Price Per Doz. cents	Purchasing Power[a] 1910-14=100 percent	Production 1,000,000
1910	11.5	105	--	23.2	108	--
1911	10.4	93	--	19.2	88	--
1912	10.8	95	--	23.3	104	--
1913	11.8	104	--	22.6	101	--
1914	11.9	103	--	22.8	99	--
1915	11.3	96	--	21.8	94	--
1916	13.4	103	--	25.0	97	--
1917	17.0	102	--	34.7	105	--
1918	21.2	109	--	41.0	107	--
1919	24.1	108	--	46.3	106	--
1920	25.3	104	--	49.9	105	--
1921	20.5	117	--	34.5	100	--
1922	19.0	112	--	30.3	90	--
1923	19.1	106	--	31.3	89	--
1924	19.2	106	--	31.7	89	1190
1925	21.4	115	--	35.4	97	1192
1926	22.6	125	135	33.6	95	1231
1927	21.4	119	134	30.7	87	1209
1928	22.4	122	133	32.5	90	1190
1929	24.0	133	132	34.3	96	1104
1930	19.4	113	117	26.7	80	1170
1931	16.2	111	118	19.4	67	1258
1932	11.9	94	121	16.9	68	1301
1933	9.3	75	128	16.3	68	1285

TABLE XIX (Continued)

| | Chickens | | | Eggs | | |
Year	Price Per lbs. cents	Purchasing Power[a] 1910-14=100 percent	Numbers on Farms 100,000	Price Per Doz. cents	Purchasing Power[a] 1910-14=100 percent	Production 1,000,000
1934	11.4	84	136	18.5	69	1243
1935	15.8	112	136	24.9	90	1145
1936	16.6	119	117	23.8	86	1220
1937	16.6	112	123	22.7	78	1294
1938	16.6	119	132	22.3	81	1259
1939	14.6	106	117	18.8	69	1214
1940	13.7	97	119	19.4	70	1287
1941	16.8	112	125	24.8	85	1335
1942	20.1	118	131	31.2	93	1422
1943	26.3	137	141	39.2	104	1518
1944	24.5	119	155	32.5	81	1697
1945	26.6	125	133	40.2	96	1616
1946	27.1	116	139	38.8	84	1643
1947	29.5	109	117	47.9	90	1587
1948	32.7	112	109	50.4	88	1482
1949	30.2	107	102	46.0	83	1563
1950	24.7	85	115	35.5	63	1596
1951	29.0	91	111	48.9	78	1603
1952	24.7	76	113	41.9	66	1601

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XX

MILK: Prices, Production, and Production Per Cow,
Michigan, 1910-1952

Year	Price Per Cwt.	Purchasing Power[a] 1910-14=100	Production	Production Per Cow
	dollars	percent	1,000,000 lbs.	lbs.
1910	1.44	98	--	--
1911	1.46	99	--	--
1912	1.49	98	--	--
1913	1.57	102	--	--
1914	1.60	103	--	--
1915	1.58	99	--	--
1916	1.67	95	--	--
1917	2.31	103	--	--
1918	3.01	115	--	--
1919	3.51	118	--	--
1920	3.40	105	--	--
1921	2.22	95	--	--
1922	2.11	93	--	--
1923	2.49	104	--	--
1924	2.17	90	4156	5050
1925	2.26	91	4042	4990
1926	2.30	95	4038	5210
1927	2.38	99	3941	5220
1928	2.39	98	3973	5290
1929	2.42	100	4028	5300
1930	2.10	92	4014	5160
1931	1.53	78	4217	5200
1932	1.10	65	4294	5100
1933	1.18	72	4297	4950
1934	1.46	81	4224	4800
1935	1.63	87	4257	4950
1936	1.83	98	4465	5180
1937	1.98	100	4470	5150
1938	1.72	92	4560	5200
1939	1.66	90	4762	5350
1940	1.81	97	4949	5450
1941	2.18	109	5124	5480
1942	2.56	113	5296	5500
1943	3.20	125	5333	5360
1944	3.32	121	5375	5270
1945	3.27	115	5741	5590
1946	3.92	125	5708	5640

TABLE XX (Continued)

Year	Price Per Cwt. dollars	Purchasing Power[a] 1910-14=100 percent	Production 1,000,000 lbs.	Production Per Cow lbs.
1947	4.32	120	5590	5710
1948	4.80	123	5341	5610
1949	3.95	105	5668	5910
1950	3.61	93	5779	5970
1951	4.40	103	5474	6410
1952	4.08	95	5448	6470

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XXI

BUTTER AND BUTTERFAT: Prices and Production in Michigan

	Creamery Butter			Butterfat	
	Price Per Lb.	Purchasing Power[a] 1910-14=100	Production	Price Per Lb.	Purchasing Power[a] 1910-14=100
Year	dollars	percent	10,000 lbs.	dollars	percent
1910	.26	104	--	--	--
1911	.23	89	--	--	--
1912	.27	105	--	--	--
1913	.27	105	--	--	--
1914	.26	97	--	--	--
1915	.26	96	--	--	--
1916	.29	96	--	--	--
1917	.37	96	--	--	--
1918	.45	100	--	--	--
1919	.53	104	--	--	--
1920	.56	100	--	--	--
1921	.38	96	--	.40	62
1922	.36	92	6634	.37	60
1923	.43	104	7168	.45	67
1924	.43	104	7439	.42	62
1925	.44	104	7540	.44	64
1926	.45	108	7204	.43	64
1927	.47	115	6937	.47	71
1928	.48	115	6580	.48	71
1929	.47	112	6343	.46	69
1930	.38	96	6593	.36	57
1931	.28	85	7560	.26	48
1932	.21	73	7861	.19	40
1933	.21	73	7964	.20	43
1934	.25	81	7644	.24	48
1935	.30	92	7744	.29	55
1936	.34	104	8216	.33	64
1937	.35	104	8089	.35	64
1938	.29	88	8676	.28	55
1939	.27	85	9009	.25	48
1940	.30	92	9577	.30	57
1941	.36	104	9031	.36	64
1942	.42	108	7740	.42	67
1943	.50	112	7369	.52	74
1944	.49	104	6418	.53	69
1945	.50	100	5546	.53	67
1946	.63	115	4658	.69	79

TABLE XXI (Continued)

| Year | Creamery Butter | | | Butterfat | |
	Price Per Lb. dollars	Purchasing Power[a] 1910-14=100 percent	Production 10,000 lbs.	Price Per Lb. dollars	Purchasing Power[a] 1910-14=100 percent
1947	.75	119	4793	.71	76
1948	.78	115	4322	.83	76
1949	.64	100	6100	.65	62
1950	.64	96	5891	.65	60
1951	.68	92	4866	.73	62
1952	.67	88	4623	.77	64

Source: Reports of State Agricultural Statistician, Lansing, Michigan

[a]Purchasing power was computed by deflating the annual price using the index of prices paid by farmers in United States.

TABLE XXII

CASH CROPS AND FEED GRAINS: Acreage, Production and Yield, Michigan, 1910-1952

	Cash Crops[a]			Feed Grains[b]		
Year	Acreage 1000 acres	Production[c] 1910-14=100 percent	Yield[d] 1910-14=100 percent	Acreage 1000 acres	Production[c] 1910-14=100 percent	Yield[d] 1910-14=100 percent
1910	1823	104.5	108.2	3298	100.5	100.2
1911	1975	104.6	103.2	3280	95.4	94.8
1912	1686	87.4	85.3	3197	101.0	104.5
1913	1802	100.0	94.1	3260	94.9	95.0
1914	1834	103.5	109.2	3355	108.2	105.5
1915	1943	86.6	97.8	3365	108.5	98.6
1916	1687	58.9	75.7	3173	85.3	87.6
1917	1842	85.6	88.1	3440	91.9	89.1
1918	1713	73.6	80.7	3568	116.9	105.2
1919	1714	92.0	111.8	3405	103.4	89.6
1920	1728	94.8	97.8	3446	131.2	117.6
1921	1656	79.4	90.1	3447	99.4	85.8
1922	1913	96.4	91.4	3358	103.1	99.4
1923	1951	101.5	101.7	3364	95.4	95.3
1924	1792	109.2	117.3	3173	96.0	102.8
1925	1768	101.2	104.5	3276	106.2	106.0
1926	1841	103.0	105.5	3091	93.9	99.1
1927	1723	86.6	99.9	2966	82.1	91.8
1928	1641	89.1	96.5	3086	97.9	101.6
1929	1632	72.6	83.2	2691	68.3	81.8
1930	1706	75.2	91.6	2896	80.5	91.0
1931	1677	95.7	112.9	3275	96.6	93.1
1932	1674	115.4	127.3	3265	100.4	95.0
1933	1992	94.6	93.7	2948	77.6	81.5
1934	1909	101.7	90.7	3084	70.7	73.0
1935	1853	109.8	115.7	3254	112.8	108.5

TABLE XXII (Continued)

| | Cash Crops[a] | | | | Feed Grains[b] | | |
| Year | Acreage | Production[c] | Yield[d] | Acreage | Production[c] | Yield[d] |
	1000 acres	1910-14=100 percent	1910-14=100 percent	1000 acres	1910-14=100 percent	1910-14=100 percent
1936	1744	86.4	102.5	2995	74.0	78.8
1937	1782	100.3	109.7	3085	96.8	98.0
1938	1706	109.4	124.6	3036	106.7	111.0
1939	1566	100.7	122.3	2995	110.6	104.9
1940	1664	97.2	117.0	3116	115.6	121.1
1941	1690	103.9	117.1	3016	101.1	104.3
1942	1466	99.3	129.8	3364	141.1	135.7
1943	1543	93.3	107.0	2855	80.2	86.5
1944	1837	107.5	122.0	3261	101.9	100.0
1945	1585	101.1	142.0	3374	119.1	115.5
1946	1621	102.0	132.3	3457	118.7	113.3
1947	1832	101.3	128.5	2774	83.9	95.2
1948	2148	129.7	141.5	3242	124.1	120.0
1949	2085	140.9	155.7	3349	142.1	129.9
1950	1744	115.0	148.3	3146	114.5	119.4
1951	1724	112.3	149.6	3291	127.2	126.9
1952	1874	119.9	152.6	3268	132.4	129.3

Source: Reports of State Agricultural Statistician, Lansing, Michigan.

[a]Includes winter wheat, sugar beets, field beans and potatoes.
[b]Includes corn, oats, and barley.
[c]Production relatives (base period 1910-14=100) were weighted by average total value from 1924-1928. The weighted relatives were converted to an index using a base period of 1910-14=100.
[d]Yield relatives (base period 1910-14=100) were weighted by annual acreages. The weighted relatives were converted to an index using a base period 1910-14=100.

TABLE XXIII

MEAT PRODUCTS AND POULTRY PRODUCTS: Production in
Michigan, 1910-1952

Year	Numbers of Meat Animals[a] 1924-28=100	Poultry Production[b] 1924-28=100	Year	Numbers of Meat Animals[a] 1924-28=100	Poultry Production[b] 1924-28=100
	percent	percent		percent	percent
1910	97.9	--	1932	88.4	103.4
1911	103.6	--	1933	96.4	104.3
1912	101.0	--	1934	95.5	103.7
1913	98.5	--	1935	86.4	99.1
1914	99.0	--	1936	91.6	97.8
1915	103.3	--	1937	98.6	103.4
1916	107.1	--	1938	98.7	103.6
1917	104.4	--	1939	102.6	97.4
1918	105.0	--	1940	112.7	102.0
1919	107.4	--	1941	113.8	106.2
1920	110.0	--	1942	115.2	112.7
1921	105.1	--	1943	125.0	120.5
1922	105.2	--	1944	135.8	134.1
1923	105.3	--	1945	120.3	124.2
1924	103.2	100.7	1946	114.6	127.2
1925	92.9	95.0	1947	106.9	118.7
1926	89.6	103.1	1948	98.9	113.2
1927	89.8	101.2	1949	100.1	113.7
1928	90.6	100.0	1950	104.1	118.7
1929	87.9	94.8	1951	108.0	118.1
1930	85.5	94.9	1952	122.4	118.6
1931	82.3	100.2			

[a]Includes cattle, hogs and sheep. Relatives of numbers on farms (base period 1910-14=100) were weighted by average total value of slaughter receipts from 1937-41. The weighted relatives were then converted to an index using a base period 1924-28=100.

[b]Includes chickens and eggs. Relatives of chicken numbers and egg production (base period 1924-28=100) were weighted by average total value from 1924-1928. The weighted relatives were converted to an index using a base period 1924-28=100.

TABLE XXIV

FERTILIZER: Consumption in Michigan
and United States[a]

Year	United States[b]	Michigan[c]	Year	United States[b]	Michigan[c]
	1000 tons	tons		1000 tons	tons
1910	5547	--	1932	4545	82,000
1911	6108	--	1933	5110	80,000
1912	5852	--	1934	5794	82,000
1913	6416	--	1935	6534	111,000
1914	7194	--	1936	7222	125,693
1915	5418	--	1937	8433	144,500
1916	5214	--	1938	7758	132,702
1917	6087	--	1939	7993	144,811
1918	6580	--	1940	8656	166,564
1919	6751	--	1941	9607	190,025
1920	7296	--	1942	10331	259,495
1921	4977	--	1943	11734	240,084
1922	5798	--	1944	13330	287,858
1923	6571	--	1945	13988	340,066
1924	6999	95,000	1946	16087	362,147
1925	7503	109,000	1947	17398	393,274
1926	7531	105,000	1948	17596	417,401
1927	7074	117,000	1949	17928	443,252
1928	8215	150,000	1950	19759	510,826
1929	8200	153,000	1951	20900	542,933
1930	8425	145,000	1952		605,157
1931	6541	105,000			

[a]Includes sales of commercial fertilizer companies and
fertilizer distributed by government agencies.

[b]Data taken from Agricultural Statistics, 1952.

[c]1924-1935 Estimated tonnage taken from Agricultural
Statistics, 1937.
1935-1952 Compilation by the Soil Science Department,
Michigan State College.

TABLE XXV

GOVERNMENT PRICE SUPPORT ACTIVITIES IN SELECTED COMMODITIES:
Loans or Purchases Made by the Commodity Credit Corporation in United States[a]

Year	Wheat 1000 dollars	Corn 1000 dollars	Barley 1000 dollars	Oats 1000 dollars	Rye 1000 dollars	Dry Beans 1000 dollars	Butter 1000 dollars	Potatoes 1000 dollars
1933	--	121,276	--	--	--	--	--	--
1934	--	11,042	--	--	--	--	--	--
1935	--	13,934	--	--	--	--	--	--
1936	--	87	--	--	--	--	--	--
1937	--	30,851	--	--	--	--	29,095	--
1938	49,216	130,882	--	--	--	--	3,042	--
1939	117,370	171,756	2,391	--	567	--	19	--
1940	200,629	62,835	6,860	--	1,619	--	--	--
1941	361,556	80,914	8,152	--	1,224	--	--	--
1942	468,168	43,605	558	--	3,133	2,544	--	--
1943	164,293	6,648	2,799	--	99	--	--	6,896
1944	249,841	18,439	758	--	44	--	--	7,504
1945	80,261	2,768	374	1,275	17	--	--	38,915
1946	31,788	28,140	322	364	--	--	--	63,873
1947	57,173	1,480	35,748	141	--	6	--	10,229
1948	518,353	524,469	31,254	9,917	934	33,105	--	29,555
1949	669,215	446,040	33,020	20,294	1,029	51,069	--	8,598
1950	375,186	72,528	16,656	9,901	1,513	9,205	--	--
1951	393,211	15,364	--	8,310	602	15,885	--	--

[a]Data taken from Agricultural Statistics, 1952.

APPENDIX C

EQUATIONS FOR TREND LINES

(X represents time measured in years since 1910.

Y represents various series of data as listed in the

Tables of Appendix B.)

CORN:

    Prices $\qquad$ $Y = 1.0453 - .0401X + .0013X^2$

    Purchasing Power $\qquad$ $Y = 120.7924 - 3.0885X + .0675X^2$

    Production $\qquad$ $Y = 592.2156 - 14.6772X + .4174X^2$

    Yield $\qquad$ $Y = 33.1558 - .4013X + .0136X^2$

OATS:

    Prices $\qquad$ $Y = .5799 - .0239X + .0075X^2$

    Purchasing Power $\qquad$ $Y = 107.4101 - 3.3335X + .0736X^2$

    Production $\qquad$ $Y = 551.2857 - 11.8527X + .3010X^2$

    Yields $\qquad$ $Y = 34.8149 - .5314X + .0163X^2$

BARLEY:

    Prices $\qquad$ $Y = .9373 - .0387X + .0012X^2$

    Purchasing Power $\qquad$ $Y = 110.4402 - 3.7651X + .0815X^2$

    Production $\qquad$ $Y = 192.5167 + 27.2971X - .5662X^2$

    Yields $\qquad$ $Y = 24.9180 - .3314X + .0133X^2$

WINTER WHEAT:

    Prices $\qquad$ $Y = 1.5651 - .0629X + .0018X^2$

    Purchasing Power $\qquad$ $Y = 121.6608 - 3.8332X + .0758X^2$

    Production $\qquad$ $Y = 1812.7188 - 63.2716X + 2.3226X^2$

    Yields $\qquad$ $Y = 15.50 + .234X$

RYE:

    Prices $\qquad$ $Y = 1.1551 - .0527X + .0015X^2$

    Purchasing Power $\qquad$ $Y = 120.5259 - 4.4917X + .0935X^2$

    Production $\qquad$ $Y = 6731.03 - 171.85X$

    Yields $\qquad$ $Y = 14.0500 - .1995X + .0056X^2$

BUCKWHEAT:

Prices $\qquad$ $Y = 1.0786 - .0347X + .00092X^2$

Purchasing Power $\qquad$ $Y = 105.42 - 1.076X$

Production $\qquad$ $Y = 793.3167 - 10.4200X - .0803X^2$

Yields $\qquad$ $Y = 11.99 - .064X$

ALL HAY:

Prices $\qquad$ $Y = 18.4999 - .8033X + .0204X^2$

Purchasing Power $\qquad$ $Y = 107.4018 - 4.3043X + .0809X^2$

Production $\qquad$ $Y = 291.88 + 1.877X$

Yields $\qquad$ $Y = 1.10 + .0069X$

POTATOES:

Prices $\qquad$ $Y = .9746 - .0374X + .0013X^2$

Purchasing Power $\qquad$ $Y = 125.1249 - 1.5785X + .0421X^2$

Production $\qquad$ $Y = 312.49 - 3.578X$

Yields $\qquad$ $Y = 81.32 + 1.118X$

FIELD BEANS:

Prices $\qquad$ $Y = 4.57 + .0307X$

Purchasing Power $\qquad$ $Y = 124.74 - 1.078X$

Production $\qquad$ $Y = 286.58 + 4.45X$

Yields $\qquad$ $Y = 579.36 + 7.90X$

SUGAR BEETS:

Prices $\qquad$ $Y = 7.7204 - .1728X + .0070X^2$

Purchasing Power $\qquad$ $Y = 93.617 - .115X$

Production $\qquad$ $Y = 991.73 - 7.806X$

Yields $\qquad$ $Y = 7.84 + .023X$

PEARS:

    Prices $Y = 1.0630 - .0356X + .0015X^2$

    Purchasing Power $Y = 87.07 + .517X$

    Production $Y = 509.79 + 11.19X$

PEACHES:

    Prices   (no significant trend)

    Purchasing Power $Y = 100.147 - .935X$

    Production $Y = 1069.045 - 42.2108X + 2.9761X^2$

APPLES:

    Prices $Y = .626 + .0237X$

    Purchasing Power $Y = 98.412 + .816X$

    Production   (no significant trend)

ALL CATTLE:

    Number on Farms $Y = 1397.5838 - 1.8616X + .3712X^2$

BEEF CATTLE:

    Prices $Y = 8.9923 - .6322X + .0228X^2$

    Purchasing Power $Y = 112.4058 - 4.5375X + .1457X^2$

VEAL CALVES:

    Prices $Y = 12.1158 - .6418X + .0243X^2$

    Purchasing Power $Y = 111.8977 - 3.0241X + .0987X^2$

HOGS:

    Prices $Y = 12.0242 - .5257X + .0180X^2$

    Purchasing Power $Y = 111.4501 - 3.3322X + .0861X^2$

    Number on Farms $Y = 1125.6066 - 22.6778X + .4444X^2$

SHEEP:

    Prices $Y = 7.2174 - .3205X + .0090X^2$

    Purchasing Power $Y = 122.3734 - 4.1895X + .0831X^2$

LAMBS:

    Prices $Y = 11.0240 - .4808X + .0187X^2$

    Purchasing Power $Y = 117.3269 - 1.9671X + .0680X^2$

WOOL:

    Prices $Y = .272 + .00413X$

    Purchasing Power $Y = 113.53 - .206X$

    Production $Y = 9195.5911 - 2.6789X - 3.4120X^2$

CHICKENS:

    Prices $Y = 13.15 + .297X$

    Purchasing Power $Y = 105.16 + .156X$

    Numbers on Farms   (no significant trend)

EGGS:

    Prices $Y = 31.6106 - .6671X + .0225X^2$

    Purchasing Power $Y = 106.6206 - 1.5024X + .0224X^2$

    Production $Y = 1177.7606 + .4530X + .6790X^2$

MILK COWS:

    Numbers on Farms $Y = 749.94 + 6.246X$

MILK:

    Prices $Y = 2.2712 - .0706X + .0028X^2$

    Purchasing Power $Y = 107.0504 - 1.5693X + .0445X^2$

    Production $Y = 3866.9314 + 44.1787X + 1.1748X^2$

    Production per Cow $Y = 4838.0026 + 16.5877X + .9967X^2$

BUTTER:

    Prices $Y = .3640 - .0072X + .00034X^2$

    Purchasing Power   (no significant trend)

    Production $Y = 6275.4995 + 288.0512X - 11.9293X^2$

BUTTERFAT:

    Prices $Y = 50.3984 - 3.4867X + .1506X^2$

    Purchasing Power $Y = 65.3841 - 1.2013X + .0483X^2$

CASH CROPS:

    Acreage $Y = 1790.52 - 1.15X$

    Production $Y = 95.416 - .834X + .035X^2$

    Yield $Y = 115.2 - 3.32X + .111X^2$

FEED GRAINS:

    Acreage $Y = 3300.11 - 4.98X$

    Production $Y = 93.84 + .389X$

    Yield $Y = 102.9 - 1.241X + .042X^2$

HAY AND POTATOES:

    Acreage $Y = 3058 - 8.02X$

MEAT ANIMALS:

    Production $Y = 96.65 + .266X$

POULTRY PRODUCTS:

    Production $Y = 94.22 + .991X$